







Everard Holmes

Genl agent

P. O. & B. R. R.

Nov 27, 1889

Thomas Norrell  
Silver Spring, Maryland,  
1950.













BAY WINDOW PARLOR CAR, Pennsylvania Railroad,  
(Floor Plan shown in Fig. 210.)

# THE CAR-BUILDER'S DICTIONARY:

AN ILLUSTRATED VOCABULARY OF TERMS  
+ WHICH DESIGNATE AMERICAN RAILROAD +  
CARS, THEIR PARTS AND ATTACHMENTS.

COMPILED FOR THE MASTER CAR-BUILDERS' ASSOCIATION

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ASSISTED BY

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And CALVIN A. SMITH, *Secretary of the Master Car-Builders' Association.*

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REVISED AND ENLARGED EDITION,

TO WHICH HAS BEEN ADDED A VOCABULARY OF THE LEADING TERMS USED IN ENGLISH RAILWAY CARRIAGE  
AND WAGON CONSTRUCTION.

Compiled by A. M. WELLINGTON, C. E.,

ASSISTED BY MEMBERS OF THE EXECUTIVE COMMITTEE OF THE MASTER CAR-BUILDERS' ASSOCIATION.



NEW YORK:

THE RAILROAD GAZETTE, 73 BROADWAY.

1888.



## ACTION OF THE MASTER CAR-BUILDERS' ASSOCIATION.

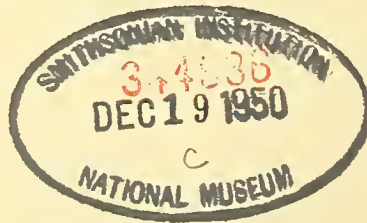
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At the Fifth Annual Convention, held in Richmond, Va., in 1872 (*see page 18 of Report of that meeting*), it was

“*Resolved*, That a committee be appointed with power to publish an illustrated book, defining the proper terms or names of each and every part used in the construction of railway cars, and a description of the use of the same.”

At the Fourteenth Annual Convention, held in Detroit in 1880 (*see pages 11 to 20 of Report of that meeting*),

“The committee to whom was assigned the duty of preparing a Dictionary of Terms used in the Construction of Cars submitted a copy of the book and reported that they had finished their work, and were discharged.”



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## PREFACE TO THE FIRST EDITION.

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Ever since the general interchange of cars among different railroads, a great deal of inconvenience, confusion, and delay, has been caused to those who build and repair them by the want of common names for the different parts of cars. One part is known by one name at one place and by quite different names at other places; and, what causes still worse confusion, a term often means one thing on one road and quite a different thing on another. A *Drawbar* is called a "Pull-iron" in one section, a "Shackle-bar" in another, and in some of the Middle and Southern states it is known by the euphonious name of a "Bull-nose." A *Journal-box* in one place means the brass-bearing which rests on, and is exposed to, the friction of the axle-journal; at other places, it means the cast-iron box which incloses the journal and its bearing and holds the lubricating material. Numberless examples of a similar kind might be given. The art of car-building, in fact, has grown more rapidly than the language relating to it. Early in the history of the Master Car-Builders' Association this subject attracted attention, and in 1871 a Committee was appointed to prepare a "Dictionary of Terms used in Car-building." This Committee originally consisted of eight or ten members, who held a number of meetings without accomplishing much, and it soon became apparent that it was too unwieldy to do the work which had been undertaken. It was finally narrowed down to those members of the Association whose names appear on the title page of this book, who were courageous enough to undertake the task of completing the work, probably, only because they were then quite ignorant of its magnitude.

The first plan was to give, as far as possible, the names of all the parts of cars and the synonyms in use in different parts of the country. This, it was soon found, would make the book much larger and the vocabulary more cumbersome than seemed desirable, and, at the same time, would rather add to than diminish the existing confusion. The Committee, therefore, determined to confine its labors chiefly

to selecting and assigning appropriate terms to those parts and objects which are in common use, and which pertain to railroad cars.

It should be noticed, too, that, to supply the want which demanded such a vocabulary, what might be called a double dictionary is needed. Thus, supposing that a car-builder in Chicago received an order for a *Journal-box*; by looking in an alphabetical list of words he could readily find that term and a description and definition of it. But suppose that he wanted, himself, to order such castings from the shop in Albany and did not know their name: it would be impracticable for him to commence at A and look through to Z, or until he found the proper term to designate that part. It was therefore necessary, in a dictionary of this kind, to provide the most copious illustrations and arrange them in some systematic way so that a person could find a representation of any part of a car he might have in mind, and from that illustration find the name. The manner in which this want has been met is fully described in the DIRECTIONS FOR USING THE DICTIONARY which follow the preface.

The system of cross-references employed in "Knight's Mechanical Dictionary" has also been adopted here. Thus, under the term *Axle* there are references to "*master car-builders' standard axle, muley axle, street-car axle,*" etc. Under the word *Bar* a list of various kinds of bars, such as "*arch-bar, drawbar, guide-bar,*" etc., is given. This will often aid very materially in finding terms.

Of the defects of the book, and its incompleteness, no one can be so well informed as the Committee who are its sponsors. Several years' time would be too little to devote to the compilation of such a dictionary, if completeness were aimed at; and if more care could have been given to the preparation of the material in the book, it could have been confined within considerably smaller limits, but at the same time more thorough investigation would have increased the vocabulary very much in other directions.



In fact, there is hardly a limit to the scope which such a book might cover. It was at one time intended to include the names of all the different materials used in car-building, and a good deal of data was collected for that purpose; but it was found that to do so would involve more time and labor than the Committee could devote to it, and therefore that part of the work had to be omitted.

Of the philological qualifications of the Committee for their work, it perhaps need only be said, to disarm criticism, that none of its members knows any other language than the one he inherited, and that very imperfectly. Two of them are practical car-builders, one of them in charge of the cars of one of the largest and most fully equipped roads in the country; and the compiler, during all the time that the book was in preparation, was actively engaged in editing a weekly technical paper. The only time any of the members of the Committee could give to the work was that which could be eked out from his other duties. They are, herefore, compelled to submit their work to the public,

knowing its imperfection and how much it might be improved if the requisite labor could be devoted to it. They trust, however, it will prove useful in establishing a common language where now there is well nigh a Babel of confusion.

One word more must be added to this long preface. Possibly some persons may be found who will object to the advertisements appended to the end of the book. The reason for these is that the cost of preparing the engravings was so great that no publisher would have undertaken to issue the book for the proceeds of its sale alone, and the treasury of the Car-Builders' Association was empty. In this condition of things *The Railroad Gazette* proposed to undertake the publication of the Dictionary at its own expense, if the Car-Builders' Association would give the privilege of publishing the advertisements. The proposition was accepted, and it is thought that readers and users of the book will not find the advertisements any detriment to its usefulness, but rather an advantage.

## PREFACE TO THE REVISED EDITION.

The additions and modifications made in preparing the new edition of the Car-builders' Dictionary, have been as follows :

The number of engravings has been increased from 811 to 2,188. Allowing for a slight difference in style of numbering, there are, as nearly as may be, three times as many engravings in this edition as before. All drawings which appeared in the last edition appear also in this, but 156 of the 811 engravings have been made over new to obtain larger or better views.

To accommodate this great increase, as well as for greater neatness and convenience, the size of the page has been nearly doubled. This has the advantage of enabling different views of the same object or class of objects to be presented in nearly all cases on a single page, or on two pages facing each other.

An alphabetical classification and sub-classification of the engravings has been introduced in order to save the necessity of referring to an index to find a particular engraving or class of engravings. A double classification is necessary, since it is desirable to keep engravings of the same class together so far as possible. Therefore, ninety-tenths of the engravings (excluding a few of a more or less miscellaneous character) are first grouped together under the six grand classifications: CARS, CAR-BODIES, CAR-BODY DETAILS, FURNISHINGS, TRUCKS, TRUCK DETAILS, and each of these are sub-classified alphabetically, as will be more fully seen in the Index preceding the engravings.

To further facilitate reference to the engravings, very numerous cross references have been added, so that cases of imperfect or doubtful classification, some of which were unavoidable, might cause as little inconvenience as possible. The numbers of the engravings on each page have also been added in the outer corner, with a running alphabetical headline. Lists of names of parts shown in each engraving have been generally repeated in immediate connection with each, to avoid the necessity of turning over many pages.

Certain obsolete or partially obsolete designs and devices are still retained, at the cost of some seemingly needless space perhaps, but at the request of members of the Executive Committee of the Association to the effect that all such matters should be retained for one edition after it had

ceased to be in general use as a standard for present construction.

It will be obvious that the additions made are not as well balanced as might be desired, to give each department and detail its due relative importance, nor are the drawings or types presented always the best or most perfect that might have been and would have been chosen had it been possible to procure drawings or to extend the revision for an unlimited time for that purpose. Certain defects of this kind which may be noted, as for instance in drawings of modern sleeping cars, may in general be safely ascribed to inability to obtain the necessary drawings after repeated efforts.

Since it has become clear from past experience that, even to a larger extent than was originally contemplated, the Dictionary is used and valued for the technical information contained in it, quite as much as for use as a mere dictionary of names, many notes have been added, and not a few engravings included which were not strictly essential to the Dictionary for its primary purpose alone. Especially in the furnishings, it has been aimed to illustrate each essentially different *type* of construction, including not only those which *are* actually distinguished from each other by different names, but such as might be, if it were desirable to carry out fully such minuteness of definition. The innumerable different forms of construction which differ only in style of ornamentation or dimensions, it has of course been neither possible nor desirable to include. In the main, the simplest and most characteristic form of each detail has been selected, neglecting the more elaborate and highly ornamented forms. In the numerous cases of drawings presented in the old edition, for which new designs have since been introduced, it was, for evident reasons, especially desirable to give both the new and old designs, since the new and old are now, in the main, both in use together. It has not seemed necessary in all such cases to add complete sets of reference numbers to both designs when one had them already.

The more important modifications in the first half of the volume, the dictionary part proper, have been as follows :

The reference-numbers to the engravings have be

placed at the beginning of each definition, immediately after the name or word to be defined, instead of at the close.

The reference-numbers have been given not only once, with the principal definition, but at many cross-references, so that in general a single reference to the dictionary will enable one to turn to the engraving of the part desired.

The modifications have all been made in pursuance of one idea; to facilitate in every way ready reference from the dictionary to the engravings, and *vice versa*, as being that which is far more often required than reference to any merely verbal definition, since it is obvious that no possible definition in words of a material object can be so effective and complete as a picture of that object. As drawings of almost every detail are given, and as the number of definitions required was largely increased, advantage has also been taken of this fact to somewhat abbreviate the definitions of the simpler objects, represented by engravings, the names of which alone are often almost a definition.

On the other hand, an effort has been made to still further fulfill an important and essential feature of such a work as this, which is not effectually attained by any number of engravings alone, viz., to make clear the distinction between allied or connected or alternative types of construction; as for instance, *Platform-roof*, *Platform-hood* and *Roof-apron*; *Sill-and-plate Rod*, *Brace Straining-rod*, *Body-brace Rod* and *Body-counterbrace Rod*; *Draw-bar Carry-iron* and *Draw-timber Carry-iron*; *Berth-brace* and *Berth-chain*; *Bell-cord Splice* and *Bell-cord Coupling*, and numerous others. To better serve this purpose, as well as to save space, numerous separate definitions have been combined together, sometimes as many as a dozen or fifteen into one comparatively long one, giving explicitly such distinctions as exist between them. *Bell-cord Guide*, for instance, has but one definition instead of fourteen, the other thirteen being disposed of by a reference to the engravings and to the primary definition. The net result has been that the increase in the dictionary proper, great enough at best, has been kept within far more moderate limits than would otherwise have been possible, with, it is hoped, a substantial increase in its general utility. Many typographical and other minor errors

were detected and corrected in this process; many others, of perhaps far greater importance, have, no doubt, been committed in so doing. It is but natural that this should be so, as every reference in the former edition had, of course, to be changed, and as the number of such references is now greatly increased.

A somewhat greater number of alternate names has been given in this volume, and a comparatively short list of changes of names has been made, or rather recognized as existing. A few changes of this kind were to be expected, since it is, of course, not the true function of a dictionary, nor even a possible function, to make a language, nor to force the use of terms, if settled or approximately settled usage to the contrary exists. The most that can be done is to recommend uniformity where no approach to it exists, but if common practice settles, for example, upon the term *Deck-sash Quadrant*, instead of *Clear-story Window-sector*, the fact can only be recognized, however much architectural and geometrical analogy may favor the latter term. To this reason must be ascribed the short list of changes, practice as to many of which has become settled since the first edition of this work was prepared.

All changes which have been made, great and little, have been made only by the advice of a considerable majority of those members of the Master Car-Builders' Association who were consulted, and as many were consulted as possible, by circular or otherwise. Proof-sheets of the Dictionary as prepared were also sent to officers of the association, for emendations and corrections before making up the matter into pages. None of the changes, it is needless to add, are more than in minor matters of detail, nor was it intended to in any way vary or depart from the plan and scope of the original work. It was but natural that in a work which was the first of its kind in an entirely new field some changes might be made, after four years' use, which would add to its usefulness. It is hoped, but hardly expected, that in the effort to make these no serious and new errors have been committed.

A few typographical and other errors in the engravings are corrected in the definitions of the parts affected. They were not sufficient in number or importance to make a table of errata necessary.



## DIRECTIONS

*For Using the Car-builder's Dictionary.*

To find the meaning of a given word or term, refer to it in the alphabetical list which constitutes the first half of the book, where a definition similar to those contained in ordinary dictionaries and a reference to some engraving illustrating the object—if it is capable of such illustration—will usually be found.

To find the name of a car or part of a car, examine the alphabetical list of the different classes of engravings in the index which immediately precedes them, until the class is found to which the object looked for belongs. If preferred, the main body of the dictionary may be consulted, index references to the different classes of engravings having been included therein in their due alphabetical order. By referring to the engravings included in that class, a representation of the object will usually be found. If the engraving is of a single object, its name will be found underneath; but if it consists of several or many parts, these will each be numbered and a list of the names of the parts, arranged consecutively by their numbers, will usually be found on the same page as the engraving, or the page opposite, and always at the beginning of the class to which the engraving belongs, or in the immediate vicinity. If the list is not on the same page, a running line over the engraving refers to the page on which it can be found.

Bearing in mind the system of alphabetical classification for the engravings, it will in general be as easy to turn at once to the engraving or class of engravings desired as to look out a word in the dictionary. This system is fully explained in the heading to the index to engravings, but it may be repeated here that the great bulk of the engravings are classified under the six general headings at the side, a sub-classification in due alphabetical order being made under each of them, and in general these sub-classes themselves are again sub-classified alphabetically, down to the individual engravings. A glance at the index will make the system clear.

Thus, suppose a reader wants the name of the longitudinal timbers under the floor of a freight car nearest the centre. These form part of a freight-car body. He therefore refers to "CAR-BODIES, FREIGHT" in the engravings, and finds that they are subdivided into *Box-cars*, *Caboose-cars*, *Coal-cars*, *English "Wagon,"* *Fruit-cars*, etc., in any of which he can see the parts desired with a reference number referring to a list in the immediate vicinity.

If he wants the name of the piece of metal which rests on top of the journal of an axle and resists its wear, knowing it as a detail of a truck, he turns

**CARS,  
CAR-BODIES,  
CAR-BODY DETAILS,  
FURNISHINGS,  
TRUCKS,  
TRUCK DETAILS.**

to "TRUCK DETAILS" in the engravings, coming in alphabetical order near the close of the book, and finds them subdivided into *Axles*, *Brake-shoes*, etc., *Journal-bearings*, *Journal-boxes*, etc.

If the name of the attachment to ear window-sashes for holding them up is sought, the reader would know that it belonged to the general class designated "FURNISHINGS," and probably also to the specific class, *Window-furnishings*. Turning, therefore to "FURNISHINGS, WINDOW," it is further subdivided into "for deck-sashes" and "for lower windows," and the part desired is found in figs 1659-61, "sash-lock." A reference below it refers to fig. 1606,

which is a misplaced engraving of the same kind, which was mis-classified in order to bring a number of standards for a single car together.

Many of the smaller details, especially of patented devices and those in limited use, are referred to only once in the Dictionary; the separate names of the minor parts of which it is made up not being given except by a list under the engravings. This was deemed to be sufficient, as such minor parts were not likely to be named without knowledge of what structure or detail they belonged to, when the latter itself could be at once referred to.

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The Index to Engravings immediately precedes the Engravings.



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# A DICTIONARY OF TERMS USED IN CAR-BUILDING.

## A

**"A" car-roof.** Figs. 189, 649. A car-roof with straight carlines, meeting at a point like rafters in the centre of the upper deck.

**Acme spring.** Figs. 2036-2036½, and 2038-9. A form of elliptic spring, the peculiarity in which consists in tapering a single leaf from the centre towards the ends, without the use of a number of separate leaves. The "improved" Acme elliptic spring, figs. 2038-9, is constructed of plates with a beveled edge, arranged one above the other as usual, and held in position by a wrought-iron band, as shown in fig. 2038. The advantages claimed for this form are that a less amount of steel is required (about 10 per cent.) for the same duty; that the liability to breakage is reduced, as the strains are confined more to the centre of the bar and less at the edges, and that friction and wear between the plates is reduced.

**Acorn.** Figs. 1269-73. A general term for the ornaments or tips used to finish the ends of rods of various forms.

**Acorn butt-hinge.** Fig. 789. A trade term for hinges having the hinge-pin ornamented with acorns at each end.

**Adjustable foot-rest.** Fig. 1194. A sliding foot-seat moving on rabbet-pieces. See *Foot-rest*.

**Adjustable-globe lamp.** Figs. 848 and 869. One with a globe chimney, which can be raised or lowered to suit the height of the globe.

**Adjustable roller car-seat.** Figs. 1140-41. See *Car-seat*.

**Adjustable shade-holder.** Fig. 867. See also figs. 937-939.

**Adjusting-holes** (crank of lever hand car.) 5, figs. 1724-6.

**Adjusting-lever** (Hartley chair). 15, figs. 1150-7. A lever by which the position of the adjustable foot-rests and back is regulated.

**Adjusting-screw** ("American" steam driver brake). 15, figs. 358-9. 25, figs. 363-5.

**Adjusting-wedge** (Cowell platform and coupler). 6, fig. 538. The cam shaped iron, moved by the *compression-*

## AIR

*lever* (16), and *compression-lever connecting-rod* (7), by which the *slide-pin* (3) and *rock-lever* (2) are brought into appropriate adjustment.

**Air-brake.** Any brake operated by air pressure, but usually restricted to systems of continuous brakes operated by *compressed* air, in distinction from *vacuum brakes*, which see, which are operated by creating a vacuum. The air is compressed by some form of pump on the locomotive, and is conveyed by pipes and flexible hose between the cars, to cylinders and pistons under each car, by which the pressure is transmitted to the brake levers, and thence to the brake-shoes. The original air-brake is only used at the present time in connection with the *automatic brake*, and only on very heavy gradients, where the automatic alone is often inconvenient on account of the necessity of recharging the reservoirs. The use of the air-brake under these circumstances is now usually known as using "straight air." See *Westinghouse air-brake*. *Westinghouse automatic air-brake*. *Lough-ridge air-brake*. *Eames vacuum brake*. *Smith vacuum brake*.

**Air-chamber** (of student lamp). H, figs. 852-4.

**Air-conductor** (Bissell heater). Figs. 1358, 1363-4, 1400. Ordinarily called in other heaters, hot-air conductor or heat conductor.

**Air-cylinder** (Westinghouse brake). See 5, figs. 293-4, 298-9. A hollow cast-iron cylinder with a piston, which compresses the air required to operate the brakes. The piston in the air-cylinder is directly connected with and is worked by the piston in the *steam-cylinder*.

**Air-cylinder head** (Westinghouse brake). 6, figs. 293-4, 298-9. The cover for the lower end of the air-cylinder of an air-pump for a Westinghouse Brake. See *Cylinder-head*.

**Air-flue** (refrigerator cars). Fig. 131. The vertical passage at each end of the car through which the chilled air passes down to enter the refrigerator. At the sides are the *condensing-diaphragms* D.

**Air-gauge** (Westinghouse brake). See 14, fig. 311. A

- gauge for the pressure of air in the reservoir, similar to an ordinary steam-pressure gauge.
- Air-inlet** (Lorenz refrigerator car). Fig. 294. A general term including both the *air-strainer* and *air-pipe*.
- Air-inlet** (Westinghouse brake). E, figs. 130-130½.
- Air-inlet pipe** (Lorenz refrigerator car). U, figs. 130-130½.
- Air outlet-pipe** (Lorenz refrigerator car). H, figs. 130-130½.
- Air-pipe** (Westinghouse brake). 8, fig. 296. More properly *supply-pipe* or *air-inlet*. The *Brake-pipe*, which see, is sometimes called the air-pipe.
- Air-pipe strainer** (Westinghouse brake). 25, figs. 311, 296. Also called *inlet-strainer* and *air-strainer*, which see.
- Air-piston** (Westinghouse brake). See 8, figs. 298-9, and fig. 672. 7, fig. 299. See *Piston*. The air-pistons and steam-pistons of engines and air-pumps are generally alike in style of construction.
- Air-pump and engine complete** (Westinghouse brake). See *Engine and air-pump*. Figs. 294, 298-9, 304-6.
- Air-register** (Bissell heater). See *Register*. 20, fig. 1397.
- Air-strainer** (air-pump of Westinghouse brake). Fig. 294. 5, fig. 298. 25, fig. 311. A funnel-shaped mouth-piece on the end of the air-inlet pipe, with a perforated plate over its mouth to exclude dirt, insects, etc.
- Aisle**. Figs. 156 and 170-182. The longitudinal passage way through a passenger car, between the seats.
- Aisle seat-end**. 123, figs. 155-76; 179-80; 2 and 3, figs. 1120 and 1122. The end or arm of a transverse car-seat next the aisle. See also *Wall seat-end*.
- Aladdin lamp-burner**. Figs. 896, 898. One of the no-chimney burners for mineral oil.
- Alcove**. A recess. See *Faucet-alcove*. *Lamp-alcove*. *Water-alcove*.
- Alcove cup-holder**. 5, figs. 1594-4½.
- Alcove-faucet**. 3, figs. 1594-4½. A faucet in a water-alcove connected with a water cooler to supply drinking water. See *Faucet*.
- Alcove-front**. 1, figs. 1594-4½. See *Water-alcove front*.
- Alcove-lamp**. Figs. 855, 861 and 864. A lamp placed in a recess in the side of a car. Also called *Panel-lamp*, as it is usually covered by a panel. Used chiefly in sleeping-cars.
- Alcove-lamp reflector**. 25, figs. 855 and 864.
- Alcove-pan or bottom**. 2, figs. 1594-4½. See *Water alcove-pan* or *Bottom*.
- Alexander slip-burner**. Fig. 883. See *Slip-burner*.
- Allen paper-wheel**. Figs. 2159-61. A car-wheel with a tire and centre formed of compressed paper held between two plate-iron face-plates. It is in wide and increasing use for passenger service. See *Steel-tired wheel*.
- Allen truck** (for passenger cars). Fig. 1959. An exceptional form of truck, little used, in the nature of a diamond truck, but having a journal spring. The same type is quite extensively used on freight cars, though passing out of use, and a modification of the standard journal-box was necessary for it. See fig. 1959.
- Alley-way**. Fig. 214. More properly a *corridor*. A narrow passage at the side of staterooms or compartments in parlor or sleeping cars. In Mann boudoir cars it runs the entire length of the car.
- American Brake Company's steam brake-gear**. Figs. 358-369. See also *Compression-brake*. *Steam driver-brake*. *Steam tender-brake*.
- American refrigerator car**. One of the class of cars having the ice-boxes at both ends of the car supplied from the roof. The drip-water passes off through four troughs, being utilized for cooling as it passes away. See *Refrigerator car*.
- American student-lamp**. Figs. 851-4. See *Argand-lamp*. *Student-lamp*.
- Ames automatic freight-car couplers**. Figs. 409-11. One of those recommended for further trial by the M. C. B. Association. It dispenses with both loose link and loose pin. See *Automatic freight-car coupler*.
- Anderson's sash-balance**. Fig. 1703. A device to balance the weight of the sash by a spring coiled within a *fusee*, which see, over which a cord attached to the sash passes, thus dispensing with sash-locks.
- Angle-iron**. A general term applied by makers to iron rolled in the following form: L, but with the corner rounded off somewhat. When the angle is rolled to a sharp corner and not rounded off, it is termed *square-root iron*.
- Angle-iron** ("American," horizontal-cylinder steam driver-brake). 11, figs. 358-9.
- Angle-iron fulcrum** (Cowell platform and coupler). 11, fig. 537. A piece of iron attached to the platform-sills, which forms the fulcrum for the *compression-lever*.



**Anti-clinker car-heater.** Figs. 1486-1528. See *Spear anti-clinker car-heater*.

**Anti-clinker grate.** 18, fig. 1490. A stove-grate placed below the fire-pot so as to leave an annular opening between the two through which the clinkers can be raked out from the fire.

**Anti-friction car-door hanger.** Figs. 791-801. See *Car-door hanger*.

**Anvil** (of track torpedoes). Fig. 1880. Interior pieces of iron placed directly over the fulminating powder to insure its ignition. The best track torpedoes have three anvils.

**Apron.** See *Door-apron*. *Roof-apron*.

**Arbor.** "A spindle or axle for a wheel or pinion; a mandrel on which a ring or wheel is turned in a lathe."  
—*Knight*. See *Door-latch arbor*.

**Arch.** See *Truss-arch*.

**Arch** (of an elliptic spring). Figs. 2031-33. The height from the centre of the *scrolls* at the ends of the elliptics to the under side of the main leaf of the spring. *Twice* the arch of an elliptic spring, less the thickness of the *spring-bands*, is the *set* and is the maximum amount which an elliptic spring can be compressed. In a *half-elliptic* spring, fig. 2031, the arch and set differ only in the thickness of the *spring-band*.

**Arch-bar.** Fig. 2027. 14, figs. 1907-32. A bent wrought-iron bar which forms the top member of an iron truck side-frame. The next lower member is the *inverted arch-bar*, and the next lower (occasionally used) is the *auxiliary arch-bar*, which is sometimes made *continuous*, as in figs. 1915-20. The *pedestal tie-bar* comes under all, and sometimes becomes an arch-bar. It is so called in fig. 1788. See also *Centre-bearing arch-bar* and *Centre-bearing inverted arch-bar*, for 6-wheel trucks.

**Arched roof.** Figs. 50, 85, 86. A roof, the surface of which is curved. The Mann boudoir cars are built with arched roofs, but they are otherwise at the present time little used for passenger cars. The arching of freight roofs is very slight, such as can be produced by trimming a straight carline.

**Archer automatic freight-car coupler.** Figs. 412-144. One of those recommended for further trial by the M. C. B. Association. It retains a loose link. See *Automatic freight-car coupler*.

**Arch-rail** (English). See *End arch-rail*.

**Argand burners.** Figs. 872-8. See *Lamp-burners* and below.

**Argand-lamp.** A lamp invented by Argand, a native of Geneva, about the year 1784. It consists of two concentric cylindrical tubes in which is the annular wick used in this peculiar burner. The tube inclosing the wick is closed at the bottom and communicates by a pipe with the oil reservoir. The interior tube being open, free access of air is allowed to the interior and exterior of the flame, insuring more perfect and equal combustion. In 1880 a French mechanic named Carcel patented an improvement by which the oil is pumped from the reservoir to the wick by the power derived from a spring or by the ascending column of air above the chimney. This is called the Mechanical Lamp, but is little used except in large lamps for light-houses, etc.

**Argand-lamp** (Moehring). Figs. 849-50, 872. Patented May 18, 1875. It has certain improvements in the way of convenience for filling and for the use of a long wick, as will be more clearly seen in the engraving.

<b>Arm.</b> See	<i>Berth-arm.</i>	<i>Seat-back arm.</i>
	<i>Lamp-arm.</i>	<i>Striker-arm.</i>
	<i>Seat-arm.</i>	<i>Top-arm.</i>

**Arm-cap.** 16, figs. 1122 and 1197-8. A metal plate, wooden-cap, or piece of upholstery, with which the top of a seat-end, arm-rest or chair-arm is covered. Those for chair-arms, however, are also called *chair-arm plates*, which see. An *arm-rest*, which see, is fixed to the side of the ear.

**Arm-holder** (English). 200, fig. 205. See *Arm-sling*.

**Armored brake-hose.** Brake-hose covered with a woven wire fabric, to protect it from injury or abrasion. Another form of armored brake-hose is formed by winding a continuous wire spirally around it by a machine which makes the spiral slightly smaller than the tube, so that it grips it tightly. *Vacuum brake-hose*, for the Eames and other vacuum brakes, is usually lined with coiled wire on the inside to prevent collapsing, but such is not termed armored brake-hose.

**Arm-pivot.** See *Seat-arm pivot*.

**Arm-plate.** See *Seat-arm plate*.

**Arm-rest.** 26, figs. 678-81. 39, figs. 694-5. A wooden or metal bar or ledge attached to the side of a car, and not, like an *arm-cap*, to the top of a seat-end, for passengers to rest their arms on.

**Arm-rest bracket.** Fig. 1185. See *Arm-rest*.

**Arm-sling (English).** 200, fig. 205. In a carriage, a padded ornamental leather strap, looped and secured to the *doorway pillar*. Also called *arm-holder* or *arm-strap*.

**Asbestos felt.** A preparation of asbestos in loose sheets similar to felt, for use as a non-conductor. It is largely used in refrigerator cars. It is manufactured for that purpose in rolls about 42 in. wide, and weighs about 1 lb. per square yard. It must be handled with care to prevent tearing.

**Ascending-rail (English).** 175, figs. 205, 207. Nearest American equivalent, *grab-iron* or *hand-rail*. The *end ascending rail* is a long wrought-iron bar secured at the ends of a covered vehicle, serving as a hand-rail for ascending to the roof. The *roof ascending-rail*, or *roof commode handle*, 176, figs. 205 and 207, is a similar hand-rail at the end of the roof of a covered vehicle.

**Ascending-step (English).** 174, figs. 205 and 207. Nearest American equivalent, *ladder-round*. A roughed wrought-iron plate secured to the ends of a covered vehicle serving as a step to ascend to the roof. They are used in England on both passenger and freight cars. In America, only on freight cars.

**Ash-dump (Searle heater).** M, fig. 1484-5. A trap under the *ash-pit* for dumping the ashes through the floor of the car.

**Ash-pit.** Figs. 1300-1537. The lower portion of every stove, under the *grate*, into which the ashes fall. Under it is sometimes placed an *ash-box*, as in fig. 1350, or an *ash-dump*, M, fig. 1484-5. The ash-pit is made up of a casting usually called the *ash-pit base* and closed by an *ash-pit front* carrying one, or more commonly two, *ash-pit doors*. The doors are distinguished as right and left; as for a person standing facing the stove. The ash pit doors are sometimes carried as in fig. 1472 on an *ash-pit jamb* instead of an *ash-pit front* or *frame*. Below are references to a few of the many such parts.

**Ash-pit (Baker heater).** 2, figs. 1301, 1303.

**Ash-pit base (Spear heater).** 13, figs. 1490, 1499.

**Ash-pit door (Baker heater).** Fig. 1308.

**Ash-pit door (Spear heater).** 24, figs. 1487-89, 1507.

**Ash-pit door-handle (Baker heater).**

**Ash-pit front (Spear heater).** 23, figs. 1487-9, 1507.

**Astral Argand-burner.** Fig. 878. See *Argand-lamp*.

**Atmospheric brake.** See below, also *Air brake*. *Vacuum brake*.

**Attock's body-block (English).** 186, figs. 204-5. See *India-rubber body-cushion*.

**Atwood hemp-packed car wheel.** Figs. 2166-68. A car wheel with a cast-iron wheel-centre and steel tire, the connection between the two being packed with hemp mixed with vaseline. Both the wheel-centre and the tire have *corrugations* corresponding to each other, and in addition the inner circumference of the tire has depressions or *pits* sunk into it and the circumference of the wheel-centre has *lugs* running across the corrugations. The packing is compressed by a steam-hammer into the corrugations and pits and against the lugs, its object being not only to make the wheel elastic and noiseless, but to dispense with the use of bolts in connecting the tire and wheel-centre. The packing is protected on one side by a *packing-flange* cast on the wheel-centre and on the other by a wrought-iron *cover-plate* shrunk into a dove-tailed seat in the wheel-centre after the wheel is packed. A dove-tailed lip or ring is cast on the wheel-centre which enters into a corresponding groove turned in the tire, connecting the two in such a way as in case of breakage to prevent the broken pieces from flying off. This lip, however, is not relied on to hold on the flange except in case of breakage.

**Automatic air-brake.** One which is automatically applied by breakage of a coupling, derailment, etc. The term is indefinite, but usually refers to the *Westinghouse automatic air-brake*, figs. 293-335, which see, which is the only one in general use in this country. See also *Compression-brake*, figs. 368-9.

**Automatic closet-ventilator.** Figs. 1097-8. See *Bell's exhaust hopper-ventilator*.

**Automatic drip-valve (American steam driver brake).** 6, figs. 358-9, 363-5; 13, figs. 363-5. A valve below the steam-cylinder to receive and eject the water of condensation. It operates on the principle of the ordinary steam-trap.

**Automatic freight-car coupler.** Figs. 409-423. A kind of device, no form of which has as yet come into general use, for dispensing with the necessity of going between the cars in coupling freight cars. Some of the so-called automatic couplers, however, do not do this. At the last convention of the Master Car-Builders' Association, 1884,



the following were named as of sufficient *prima facie* merit for experimental tests:

<i>Ames</i> , figs. 409-11.	<i>Gifford</i> , figs. 416-7, 515-6.
<i>Archer</i> , figs. 412-144.	<i>Janney</i> , figs. 420-8.
<i>Conway</i> (not shown).	<i>Mitchell</i> , fig. 415.
<i>Cowell</i> , figs. 419-194.	" <i>United States</i> ," fig. 418.
<i>Wilson-Walker</i> (not shown).	

Of these the *Cowell* and *Janney* couplers couple "in a vertical plane," so called, *i. e.*, the movement of their parts in coupling take place in a horizontal plane, and bear a close general resemblance to the *Cowell*, *Janney* and *Miller* passenger couplers. The others bear a general resemblance to the old established link-and-pin freight-car coupling. Of these latter the *Ames*, *Mitchell* and *Wilson-Walker* use neither a loose link nor a loose pin, the place of the latter being taken by a hook connected to the tongue-shaped part, which takes the place of the old link. The others use a loose link of the usual form, but have no loose pin.

At the convention referred to a resolution was passed that the vertical plane principle best fulfilled the mechanical conditions of a perfect coupler, to which class belong the *Cowell* and *Janney* couplers. Another resolution advised those roads that did not care to experiment with that type of coupler, fulfilling this mechanically perfect principle, to experiment with the other couplers named above.

**Automatic lubricator** (steam-pump of Westinghouse brake). 15, fig. 311.

**Automatic ventilator**. Figs. 1557, 1568-9. A ventilator which is self-adjusting, so as to exhaust air from a car if the train runs in either direction. A great variety of such devices exists, not all shown. See *Ventilator*. *Bell's exhaust hopper-ventilator*.

**Automatic window-catch**. Figs. 1663-4, etc. A number of other devices, which, in effect, answer to this name, are shown in the illustrations. See *Sash-lock*.

**Auxiliary arch-bar**. 16, figs. 1912-20. A wrought-iron bar sometimes used, which forms the lower member of diamond-truck side-frame. In some cases such arch-bars are made *continuous* by transverse pieces which extend across from one frame to the other under the transoms, as in the figs. referred to. See *Arch-bar*.

**Auxiliary brake-valve** (Westinghouse brake). Fig. 350; 33, fig. 311. A valve for use with the automatic brake on extra heavy gradients in either passenger or freight service, in order to provide a second means of admitting and regulating the pressure of air the engine and tender brake-cylinders. When the graduating-handle 3 is

turned, it compresses the spring until it forces the valve from its seat, which permits the air to flow into the driving-wheel brake and tender cylinders until the pressure in these cylinders is sufficient to force the spring 10 up by acting on the piston 11, when the valve again seats, preventing any further admission of air to the cylinders. Hence, the pressure admitted to the cylinders depends upon the extent to which the spring 10 is compressed by the graduating-handle. To release the brakes the graduating-handle is turned in an opposite direction, permitting the air to escape through holes in the upper part of the case. This valve is now little used, the *pressure-retaining valve*, which see, fig. 317, serving as a substitute.

**Auxiliary buffer-spring**. 6, figs. 388-9. A spring placed back of a draw-spring to give greater resistance to compression on the drawbar in buffing. In this manner two springs operate in huffing, and only one in tension.

**Auxiliary discharge-valve** (Westinghouse brake). 56, figs. 311, 351. A valve intended for use with extra long freight trains, to enable the brakes to be applied, when desired, to a part only of the train. It is not in general use, and is intended only for exceptional use.

**Auxiliary draft-spring** (Janney coupler). 27, figs. 542-554, 555-601. A spring of low capacity and limited motion, placed back of the rear follower to compensate for absence of slack.

**Auxiliary drawbar follower-plates**. 15, figs. 388-9. Iron plates which bear against the ends of an *auxiliary buffer-spring*. One plate of this kind bears against each end. The pressure on the drawbar is thus transmitted to the auxiliary spring.

**Auxiliary draw-spring** (English). 52, figs. 205 and 206. An India rubber spring on the drawbar which assists in taking the draft strain. Seldom used.

**Auxiliary release-valve** (Westinghouse double-check triple-valve). 18, figs. 355-7.

**Auxiliary reservoir** (Westinghouse automatic air-brake). 1, figs. 325-6, 293, 301-2. A cylindrical reservoir made of thin boiler iron, attached to the under side of a car or tender by *auxiliary-reservoir bands* attached through *auxiliary-reservoir beams*. In freight cars, auxiliary reservoir beams are termed *brake-cylinder blocks* and *end-blocks*, figs. 344-5. The reservoir serves to hold a supply of compressed air to operate the brakes of each car, and

is supplied from the *main reservoir* on the engine. For freight service, the auxiliary-reservoir, triple-valve and brake-cylinder are combined in one piece, fig. 352, etc.

**Auxiliary reservoir-bands** (Westinghouse brake). 17, fig. 325. See above.

**Auxiliary reservoir-beams** (Westinghouse brake). 17, fig. 325. Short wooden timbers bolted to the under side of the sills. In freight cars called brake-cylinder blocks. See above.

**Auxiliary-reservoir nipple** (Westinghouse automatic brake). 19, fig. 325. A short pipe by which the triple valve is connected with the auxiliary reservoir.

**Auxiliary rubber bearing-spring** (English). 87, fig. 205. An elastic washer interposed between the adjusting screw nut and the scroll-iron. Not in general use.

**Axle**. 2, figs. 1907-73; figs. 1974-5, etc. A shaft made of wrought-iron or steel to which a pair of wheels are attached. They are distinguished according to use as *passenger-car*, *freight-car*, *hand-car*, *street-car* axle, etc., and according to mode of manufacture as *hammered*, *faggoted*, *muck-bar* axles, etc., which see. See also *Car-axle*. 2, figs. 1907-73. In nearly all cases the wheels are both rigidly fastened to the axle, but it has been attempted to make one, or both of them, so that it can turn independently of the axle. Experience, however, has discountenanced all these attempts and indicated that the gain is far less and the loss greater than has been supposed. The M. C. B. standard axle is shown in fig. 1975. The following are the names of the parts as per fig. 1974: 1, *Centre of axle*; 2, *Neck of axle*; 3, *Wheel-seat*; 4, *Dust-guard bearing*; 5, *Collar*; 6, *Journal*. See *Hammered car-axle*.

**Axle-box** (English). A *Journal-box*, which see. See *Grease axle-box*. *Oil axle-box*.

**Axle-box cover** (English). 36, figs. 116-119 and 204. A hinged movable cover on the axle-box through which the lubricant is introduced. On English oil axle-boxes the cover is generally holted to the box, with a strip of leather interposed to make an oil-tight joint. The oil is replenished monthly through a small orifice closed by a screw-plug, or spring-hinge.

**Axle-box keep** (English). 37, figs. 116-119 and 204. The lower part of an axle-box, which in an oil-box contains the lubricant, and in a grease-box simply protects the under side of the journal from dust.

**Axle-clamp** (Am'n aut. compression-brake, which see). 1, figs. 368-9.

**Axle-collar**. F, figs. 1974-5. A rim or enlargement on the end of a car-axle, which takes the end thrust of the journal-bearing. Sometimes called a *button*.

**Axle gauges** (M. C. B. standards). Figs. 2114-23.

**Axle-guard** (English). 14, figs. 204 and 205. American equivalent, *pedestal*. The ordinary or W pattern consists of a wrought-iron plate attached to the *solebar*, which permits vertical motion of the axle-box, but restrains movement in any other direction.

**Axle-guard crown** (English). 17, figs. 116-119. The main part of the *axle-guard*, which see.

**Axle-guard crown washer** (English). 20, figs. 116-119. A piece of wrought-iron plate, used as a washer for three or more bolts, which secure the main part of the *axle-guard* to the *solebar*.

**Axle-guard keep, or horn-stay** (English). 21, figs. 116-119 and 204-207. A piece of iron which secures the lower end of the jaws of the *axle-guards* together.

**Axle-guard stay-rod, or axle-guard stretcher** (English). 15, fig. 205. American equivalent, *pedestal tie-bar*. A longitudinal rod connecting the lower ends of the *axle-guards*, and keeping them at the right distance apart.

**Axle-guard wing** (English). 18, figs. 116-119. The inclined part of an *axle-guard*, strengthening it fore and aft.

**Axle-guard wing-washer** (English). 19, figs. 116-119. A piece of plate used as a washer for two or more bolts securing the wing of the *axle-guard* to the *solebar*. See *Axle-guard wing*.

**Axle-packing**. A *dust-guard*, which see. The *journal-packing* is often called *axle-packing*.

**Axle safety-bearing** (passenger car trucks). Figs. 1955, 1958, 1960, etc. A bar of iron like an inverted letter  $\cap$ , bolted to the safety-beam of a truck above the axle. The *axle safety-strap*, 55, goes below it, the two parts together forming a circle around the axle. The *axle safety-bearing thimbles*, 56, are used as distance-pieces to hold both in their proper position. The details of the form of all these parts have some little variation, as will be seen from the illustrations.

**Axle-safety-bearing thimbles**. 56, figs. 1955-65. See below.

**Axle safety-strap**. 55, figs. 1950-69. See below.



**Axle-seat.** The hole in a car-wheel which receives the axle. More properly, it is the inside surface of this hole which comes in contact with the axle, and not the hole itself. The corresponding part of an axle is called the *wheel-seat* or *wheel-fit*.

**Ayer rubber refrigerator car.** Figs. 126-9. A car, the especial peculiarity of which is the use of sheets of rubber instead of paper as a non-conducting material. The ice is put on a rack through doors opening outside in each end of the car. See *Refrigerator car*.

B

**Babbitt-metal.** "An alloy, consisting of 9 parts of tin and 1 of copper, used for journal-boxes; so called from its inventor, Isaac Babbitt, of Boston (patent, 1839). Some variations have been made, and among the published recipes are:

Copper.....	1	1
Regulus of antimony.....	1	5
Tin.....	10	50

Another recipe substitutes zinc for antimony.

The term is commonly applied to any white alloy for bearings, as distinguished from the box-metal or brasses in which copper predominates."—*Knight*.

**Babbitt-metal bearing.** Fig. 1995. A style of bearing of which a great variety of forms exist, which in effect substitute babbitt-metal in some of its many forms for brass as a bearing surface. *Lead-lined bearings*, which see, are different in that they merely use a thin sheet of lead over the brass, to correct slight irregularities and give an even bearing-surface.

**Babcock fire-extinguisher.** Fig. 1044. A device for causing the rapid generation of carbonic-acid gas when desired, by breaking a bottle of acid in the interior by means of the *bottle-breaking head* (the handle projecting up in the centre of the top of the apparatus). The solution within consists of about 2½ lbs. of bicarbonate of soda in about 6 gallons of water.

**Back.** See *Seat-back*. *Slat seat-back*.

**Back** (for a pipe-clip). Fig. 1345. A metal strap sometimes used to attach the clips to, instead of attaching the latter directly to the surface to which the clip is attached.

**Back-arm.** See *Seat-arm*.

**Back base-plate** (Spear heater). Fig. 1501. See *Base-plate*.

**Back cylinder-head** (Westinghouse and other brakes). 4, figs. 329-31. The cofor for the end of a brake cylinder

which has an opening in the centre for the piston rod. For convenience of designation the end of the cylinder opposite to the piston rod is always called the *front* end and that adjoining the piston rod the *back* end, as in locomotives.

**Back cylinder-head** (Westinghouse tender brake). Fig. 307; 4, fig. 330.

**Back division-strips** (Spear heater). Fig. 1520.

**Back face-plate** (steel-tired wheels). Figs. 2159-71. The inner one of the two plates connecting the *tire* with the *hub*. See *Front face-plate*.

**Back foot-rest** (Hartley chair). Fig. 1157. See *Foot-rest*.

**Back hot-air pipe** (Gouge heater). 10, figs. 1405-7.

**Back of case** (Gouge heater). 81, fig. 1409.

**Back-offset** (Gouge heater). 86, fig. 1409.

**Back running-pipe** (Gouge heater). Fig. 1471. See *Running-pipe*.

**Back seat-bottom rail** (longitudinal seat). 38, fig. 1844. A horizontal wooden strip at the back edge, to which a wooden seat-bottom is attached. See also *Front seat-bottom rail*.

**Back seat-rail** (street car seats). 39, fig. 1844. A longitudinal strip of wood which extends along the back edge and is fastened to the window posts.

**Back seat-rail** (English). 152, figs. 205, 206. In a carriage a small transverse wooden bar secured to the partition and supporting the seat-boards.

**Back smoke-collar** (Gouge heater). 32, figs. 1413-4.

**Back squab** (English). 197, figs. 204, 205, 206. American equivalent, *seat-back*. In a carriage, that part of the seat which fits the small of the passenger's back, and also supports the head and a fixed back, covered with broadcloth, and stuffed with curled horse-hair, and also made elastic by *springs* (which see).

**Back squab sofa springs** (English). 202, fig. 205. Analogous to the American *back-springs*. One end of these springs butts against the partition, and the other against a sheet of stout canvas, the back squab resting against the latter.

**Baggage-barrow.** Figs. 1900-1, etc. See *Barrow-truck*. *Baggage* "wagon-truck."

**Baggage-car.** Figs. 51, 58, 59, 64, 65. A car for carrying the baggage of passengers. A *combination baggage-car*, fig. 58, is one having compartments set off for express or mail, or both. A *combination car* or *coach*, fig.

51, is a passenger car with a baggage compartment. A *push baggage-car*, which see, is a light *larry car* for at stations.

**Baggage-truck.** See *Baggage-barrow*, fig. 1900-1. *Baggage wagon-truck*, fig. 1902.

**Baggage wagon-truck.** Fig. 1902. A *four-wheeled* vehicle with a frame or rack for carrying baggage, used to move the latter by hand about railroad-stations. A *two-wheeled* vehicle is a *baggage-barrow*.

**Bail.** A curved handle of a more or less semicircular form for a pail, bucket, lantern or other utensil. As applied to *lanterns*, figs. 974-986; to *swing-barrel truck*, fig. 1904.

**Bail (to Raoul journal-box).** Fig. 2014. The latter is a yoke fastened to the sides of the journal-box, which passes over the lid and enables it to sustain the end-thrust of the axle.

**Baker car-heater.** Figs. 1300-48. A stove invented and patented by Mr. Wm. C. Baker for warming cars. It is arranged so as to heat water in a coil of pipe in the inside of the stove, and cause it to circulate through a series of pipes laid near the floor of the car. A new form of suspended heater having the stove upon the outside, as in figs. 1529-32, but otherwise operating upon much the same principle as the old heater, has recently been introduced, and is manufactured by the Standard Car Heating & Ventilating Co. The apparatus is now (1884) undergoing changes, and it is consequently impossible to present drawings. The old form of the Baker car-heater is now manufactured by Baker, Smith & Co.

**Ball.** See *Safety-valve ball* (Baker heater).

**Ball and chain** (Gouge heater). Fig. 1430. Controls the deflector-valve.

**Ballast wagon** (English). American equivalent, *gravel car*. A four-wheeled gondola car, fitted with falling doors at the sides and ends, and used for conveying ballast, rails and ties.

**Band.** See *Auxiliary Reservoir-band.* *Guard-band.*  
*voir-band.* *Platform-timber band.*  
*Belt-rail band.* *Seat-back band.*  
*Corner-band.* *Spring-band.*  
*Door-guard band.* *Tank-band, etc.*

**Band (for seat-backs).** 0 to 5, figs. 1199-1204. More properly *Seat-back moulding*, which see.

**"Banner" sun burner.** Fig. 884. See *Sun burner*.

**Banning's brake-shoe.** Figs. 1980-81. A brake-shoe, the most noticeable peculiarity of which is the fastening, which consists simply of a rod passed through a hole cast in the lower part of the brake-head and having the ends turned down. By swinging the rod up, the brake-shoe is released. The advantage claimed for the device is its lightness and convenience in removing the shoe.

**Bar.** See *Body-bolster compression-bar.* *Centre-bearing arch-bar.*  
*Body - bolster tension-bar.* *Centre-bearing inverted arch-bar.*  
*Bolt drawbar.* *Compression-bar.*  
*Buffer-bar.* *Cross-bar.*  
*Drawbar.* *Rocking-bar.*  
*Draw-timber tie-bar.* *Shackle-bar.*  
*Equalizing bar.* *Side bearing arch-bar.*  
*Grate-bar.* *Tension-bar.*  
*Guide-bar.* *Tie-bar.*  
*Pedestal tie-bar.* *Transom tie-bar.*  
*Truck-bolster guide-bar.*

**Bar-lift.** See *Bar sash-lift*.

**Barnard door-holder.** Figs. 776-8. A device the peculiarity of which is the steel wire *spring-collar* carried in a floor-stop of adjustable height, in which an acorn-like knob attached to the door engages.

**Barrel door-bolt.** Fig. 760. A door-bolt made of a round metal bar and held on its slide in a round tube or "*barrel*." It is constructed so that when it is either engaged or disengaged from its keeper, it can be turned by a short lever or knob, and held in either position by suitable stops.

**Barrow-truck.** Figs. 1900-1906. This term has been used to designate two-wheeled vehicles used about railroads for moving freight and baggage by hand; but the more usual practice is to speak of baggage *barrows* and freight *trucks*, which see, although both are sometimes designated as *barrow-trucks*.

**Bar sash-lift.** Figs. 1668-72; 21, fig. 679. A heavy sash-lift having a short horizontal metal bar attached to two flanged studs or stanchions; used for the large sashes of sleeping and drawing room cars.

**Bar shackle** (of a padlock). Fig. 1034. A rectangular, instead of U-shaped, shackle.

**Barrel seat-lock.** Fig. 1176-7. See *Seat-lock*.

**Base.** See *Ash-pit base.* *Revolving-chair-stand base.*  
*Lever-post base.* *Window-moulding base.*

**Base (car-door fastener).** 5, fig. 1109.

**Base (Hartley chair).** 12, figs. 1154-8. See *Pedestal*.



**Base** (Gouge heater). Fig. 1431.

**Base** (of ash-pit, Spear heater). Fig. 1499.

**Base-band** (Gouge heater). Figs. 1423-1432. A cast-iron band fastened to the floor to protect the bottom, front and end of case.

**Base-burner.** A furnace or stove in which the fuel is contained in a hopper termed the *magazine*, so that it is fed by gravity to the fire as the lower stratum burns away. The supply is thus continuous. The device is in principle very ancient, but it has only in recent years come into wide general use. Fig. 1472 is a base-burner, and also some other forms of heaters not shown.

**Base-plate** (of a derrick or crane). **D**, figs. 151-3. A large plate placed on the floor of the car for supporting the mast. Another method is by a *mast-pocket*, which see, underneath the car. 20, figs. 77-78.

**Base-plate** (Spear heater). 21, figs. 1486-90, 1510-12. See also *Back base-plate*, fig. 1501. A cast-iron cylindrical ring, which forms the bottom part of the heater. It has openings for cold and hot air and carries the ash-pit doors.

**Base-plate screen** (Spear heater). Fig. 1508. A grating for covering the air opening of a base-plate.

**Base-top** (Johnson heater). 22, fig. 1472.

**Base-washer** (passenger-car platform-posts). 40, figs. 155-185, and 109, figs. 1843-6. A metal ring or plate, which forms a bearing for the post on the platform end-timber.

**Basin.** 5, fig. 1600; 2, fig. 1570. A hollow vessel made of porcelain or metal, and in cars usually fixed in a suitable stand with pipes and other attachments for filling it with water and emptying it. Such basins are used as lavatories in sleeping and other passenger cars. They are emptied at the bottom through a pipe connected to the basin by a *basin-coupling*, which is closed by a *basin-plug*. The basin-plug is attached to a *basin-chain*, which again is fastened to a stanchion called the *basin-chain holder*.

**Basin-chain.** 4, fig. 1572. See *Basin*.

**Basin-chain holder.** 3, fig. 1572. See *Basin*.

**Basin-couplings.** Figs. 1572 and 1580. See *Basin*.

**Basin-plug.** 5, fig. 1572. See *Basin*.

**Basin-pump.** Figs. 1570-1. A pump of peculiar construction for supplying the basin of sleeping and parlor cars from the *tank* carried under the slab. It is called *single* or *double-acting*, according as the upward stroke only,

or both the upward and downward strokes eject water. Double-acting are most used. For names of parts, which explain themselves, see illustrations.

**Basket-rack** (English, parcel-net). Figs. 696-701; 145, figs. 155, 158, etc. A receptacle made of metal rods, or a combination of rods and wire netting for holding parcels attached to the sides of passenger cars above the heads of the passengers, so as to be out of the way. A basket-rack of extra length for the Mann boudoir cars, with exhaust ventilators at each end, is shown at 7, figs. 680-1, and one of quite exceptional form in the frontispiece. Parlor cars usually have no basket-rack, but sometimes a *package-rack* (fig. 699) is placed between the windows, within convenient reach of the passengers while sitting in their seats.

**Basket-rack bracket.** 1, figs. 696-7 and 701. A light metal or wooden support for the end or centre of a basket-rack.

**Basket-rack netting.** 2, figs. 696-7 and 701. Wire netting with very large meshes, which forms part of a basket-rack for holding small articles.

**Basket-rack rod.** 3, figs. 696-7 and 701. A small round metal bar which forms the main portion of a basket-rack, and to which the netting, when used, is fastened. Modern basket-racks rarely use netting.

**Basket-rack tip.** 4, figs. 696-7 and 701. An ornamental knob or acorn on the end of a basket-rack rod.

**Bastard Howe** (freight-car framing). Figs. 5-7. A style of framing having the vertical rods and inclined posts like the familiar Howe truss, but having also an upright post connected with the rod and serving more or less as a part of the truss. The Howe truss proper has yet never been used in freight-car construction, but the adoption of it is now under consideration on the Pennsylvania Railroad.

**Bastard Pratt framing** is a similar modification of the Pratt bridge-truss, which differs from the Howe in having vertical posts instead of rods, and inclined rods instead of braces. The regular Pratt truss is much used, however, and the bastard Pratt rarely.

**Batten.** "A piece of board or scantling of a few inches in breadth."—*Webster*.

**Batten wagon** (English). A four-wheeled flat car about 24 feet long, fitted to carry sawed timber about 23 feet long, termed *battens*.



**Bayonet-catch.** A general term derived from the manner of fastening on a bayonet to a gun, applied to the mode used in many forms of hardware and mechanical construction for connecting separate parts so as to be firmly united and yet easily removable. Many lamps are held in place by a form of bayonet-catch.

**Bay-window parlor car.** Fig. 210 and frontispiece. An exceptional and novel style of parlor car, of which only a few have as yet been built, designed to give more variety to the interior and improve the line of vision of the passenger within.

**Bead.** "A small salient moulding of semi-circular section. Also the strips on the sash frame which form a guide for the sash. These beads are known as the *inside bead*, *outside bead* and *parting bead*."—*Knight*.

In car construction the place of the *inside bead* is taken by the *window casing*, or *inside window-stop*; the place of the *outside bead* by the *outside window-stop*, and of the *parting bead* by the *sash parting-strip*, or *stop-bead*. See figs. 692-4. The term is also frequently applied to any form of small, light moulding of simple outline, as 10, figs. 1050-64. See *Moulding* and *Stop-bead*.

**Bead moulding** (English). See *Bead* and *Planted moulding*.

**Beam.** "The term *beam* is generally applied to any piece of material of considerable scantling, whether subject to transverse strain or not; as, for example, 'collar-beam,' 'tie-beam,' 'Bressummer-beam,' the two former being subject to longitudinal strains of compression and tension respectively, and the latter to transverse strain."—*Stoney*.

1. "Any large piece of timber, large in proportion to its thickness and squared or hewed for use"—*Webster*.

2. A bar of metal of similar proportions is also called a *beam*.

3. "A bar supported at two points and loaded in a direction perpendicular or oblique to its length is called a *beam*."—*Rankine*.

By analogy the term has of late years come to be applied to similar pieces or bars of iron. Thus we have iron *I-beams* and *deck-beams* (which see), to take the place of wooden beams in buildings. The term is also used to designate such things as the *beam* of a balance or scales, a *plow-beam*, the *walking-beam* of a steam-engine, *brake-beam*, etc.

See *Auxiliary-reservoir beam*.

*Brake-beam*.

*Buffer-beam*.

*Buffer-spring beam*.

*Centre-beam*.

*Centre-bearing beam*.

*Compression-beam*.

*Drop-door beam*.

*Floor-beam*.

*Middle safety-beam*.

*Needle-beam*.

*Platform-truss beam*.

*Safety-beam*.

*Spring-beam*.

*Suspender-beam*.

*Swing-beam*.

*Truss-beam*.

*Trussed brake-beam*.

**Bearing.** That which supports or rests on something, and is in contact with it. Thus a block or stone on which the end of a timber rests is called a *bearing*. The metal block or bushing in contact with a journal is called a *bearing*.

For M. C. B. standard *journal-bearing* see figs. 1982-92.

See *Axle safety-bearing*.

*Body Truss-rod bearing*.

*Brake-hanger bearing*.

*Brake-shaft bearing*.

*Centre-bearing*.

*Crank-shaft bearing*.

*Cup side bearing*.

*Dust-guard bearing*.

*Half-elliptic-spring bearing*.

*Hopkins' journal-bearing*.

*Journal-bearing*.

*Lead-lined journal bearing*.

*Lever-shaft bearing*.

*Lower brake-shaft bearing*.

*Rocker-bearing*.

*Rocker side-bearing*.

*Safety-beam truss-rod bearing*.

*Side-bearing*.

*Spring-plank bearing*.

*Stop journal-bearing*.

*Stop-key journal-bearing*.

*Swing-hanger-pivot bearing*.

*Truck-bolster truss-rod bearing*.

*Truck side-bearing*.

*Truss-rod bearing*.

*Upper brake-shaft bearing*.

**Bearing-block** (Ross flange brake-shoe). Figs. 247-8.

**Bearing-spring** (logging cars). Fig. 1817. An occasional but not the common term for the *bolster-springs* or main-springs of the car.

**Bearing-spring** (English). 22, figs. 116-119 and 204-207. American equivalent, *bolster-spring*. The spring which carries the weight of the vehicle, and rests on the *axle-box*. In English practice almost invariably a half elliptic spring.

**Bearing-spring buckle** (English). 23, figs. 116-119 and 204-207. American equivalent, *spring-band*. A solid wrought-iron strap which confines the plates of the *bearing-spring*, and is generally provided with lugs on the lower side, so that it cannot be moved transversely or longitudinally on the *axle-box*. The plates are secured to the buckle by a  $\frac{3}{8}$ -in. vertical rivet.

**Bearing-spring shoe** (English). 24, figs. 116-118. A cast-iron lipped rubbing piece, secured to the under side of the *sole-bar* on which the ends of the *bearing-spring* bear.

"Bee" door-spring. Fig. 756. See *Door-spring*.

Bell. See *Recording-bell*. *Signal-bell*. *Smoke-bell*.

**Bell-cord.** Fig. 709. A rope, one end of which is attached to a signal-bell on the engine, and which extends along the tops of the cars the whole length of the train, and is used for signaling to the locomotive runner. It is carried by various forms of *bell-cord bushings*, *bell-cord hangers* and *bell-cord guides* (which see). On freight trains, when used at all, which is the exception, it is placed on the outside, and on top of the roofs of the cars, but in passenger trains it is attached to the rafters or purlins by suitable supports, on the inside of the cars. On passenger trains, the *bell-cord* is made of lengths equal to that of each car, and is fastened together with suitable *couplings*. Bell-cord is made of flax, hemp and sometimes of leather, and is known by the following names in trade: *Brass-wire covered*; *fancy braided*; *flaxen*; *Italian hemp*; *solid leather*; *solid braided*. The usual sizes are  $\frac{1}{4}$ -in. and  $\frac{9}{32}$ -in. diameter.

The bell-cord was first used by William Hambright, a locomotive engineer, in 1833, on the old horse-power railroad between Lancaster, Pa., and Philadelphia. Hambright affixed a common bell to the interior of the engine cab, and ran a rope backward through the interior of the car. The rope, in its present form, was devised by Capt. E. A. Ayres, of the Erie Railway. The English term for a cord to answer the same purpose in a different way, is *communication-cord*, which see.

**Bell-cord beveled-bushing.** Figs. 706-8, 719, 738-9. See *Bell-cord bushing*.

**Bell-cord bushing.** Figs. 702-708 and 719, 738-9. A thimble lining a hole through a partition for a bell-cord to pass through: in distinction from a *bell-cord guide*, which is attached to the side or roof of the car or to a bell-cord hanger and serves solely the purpose which its name implies. Some confusion, however, exists in the use of these terms, as for instance, fig. 719, which is really a *bell-cord guide*, but commonly called a *bell-cord bushing*. For passing the bell-cord through inclined surfaces *beveled-bushings* are used, which are frequently provided with one or more *pulleys* to avoid friction.

**Bell-cord coupling.** Figs. 710-714. The hook attached to the end of a bell-cord to enable it to be connected or disconnected at pleasure with another bell-cord; not to be

confused with a *bell-cord splice*, figs. 743-745, which is intended as a permanent connection.

**Bell-cord double strap-hanger.** Fig. 737. See *Bell-cord hanger*.

**Bell-cord end-hook.** Fig. 715. A metal hook with a screw-shank by which it is attached to the end of a car. The hook is used to fasten the end of a bell-cord to the last car and thus hold it in its place, and prevent it from being drawn out of its guides.

**Bell-cord fixed hanger.** Figs. 732-3 and 742. See *Bell-cord hanger*.

**Bell-cord guide.** Figs. 702-42. A metal eye or ring attached to the roof or ceiling of a car, or to the end of a *bell-cord hanger* (which see), and by which a bell-cord is carried or conducted. According to their method of attachment to the car they are designated as bell-cord guides *with flange*, or *with screw*, or *with screw and flange*, and they are often provided with one or more pulleys, sometimes as many as four, as in fig. 727, when the bell-cord is to be conducted in an oblique line. The pulleys are ordinarily at the bottom, but sometimes at the side of the bell-cord guide, according to the direction of probable strain. Certain tube-like forms of bell-cord guides are occasionally miscalled *bell-cord bushings*, which see.

**Bell-cord-guide washer.** Fig. 729. An ornamental washer for making a finish for a bell-cord guide where it is attached to a car roof.

**Bell-cord hanger.** Figs. 732-45. A guide for the bell-cord, hanging usually from the centre of the clear-story or upper deck. In its original form it consists of a *bell-cord strap 2*, attached to a *bell-cord strap-hanger bracket 3*, which latter is screwed to the top of the car. The simpler forms of these brackets, as fig. 735, are called *screw-tops*. The lower end of the strap carries a ring called the *bell-cord guide 4*, which latter is often provided with a pulley at the bottom to obviate friction. To avoid unpleasant vibration, the *double strap-hanger* is used, giving greater lateral stability, and recently *bell-cord rod-hangers*, fig. 735, have been introduced, permitting no lateral motion whatever, but swinging longitudinally on a pivot. *Bell-cord fixed hangers*, figs. 732-3, etc., are chiefly used where the drop is small, although the tendency to use them in all cases is increasing.



**Bell-cord hanger bracket, or screw-top.** 3, fig. 734. See *Bell-cord hanger*.

**Bell-cord pulley, or sheave.** Figs. 716-42. A wheel in a bell-cord guide over which a bell-cord runs.

**Bell-cord rod-hanger.** Figs. 732-42. See *Bell-cord hanger*.

**Bell-cord sheave.** A *Bell-cord pulley*, which see.

**Bell-cord splice.** Figs. 743-5. A metal coupling with right and left hand screws for *permanently* splicing the ends of a broken bell-cord. See *Bell-cord coupling*.

**Bell-cord strap.** 2, figs. 734-42. See *Bell-cord hanger*.

**Bell-cord strap-hanger.** Figs. 734-741. See *Bell-cord hanger*.

**Bell-cord strap-hanger bracket.** 3, figs. 734 and 737. See *Bell-cord hanger*.

**Bell-cord strap-hanger screw-top.** 3, figs. 735-41. See *Bell-cord hanger*.

**Bell-cord thimble.** A *Bell-cord bushing*, which see.

**Bell-crank.** An L-shaped rectangular lever. often with the two extremities connected so as to be of triangular form, for changing the direction of motion by 90 degrees, more or less.

**Bell-crank (hand-car).** 23, figs. 1720-3. A crank attached to the propelling-lever shaft giving more favorable direction to the power applied to the levers.

**Bell-crank (of sofa-pull).** Fig. 1241.

**Bell-crank (steam driver-brake).** 21, figs. 363-5.

**Bell-crank (Wolfrath combined sash-lift and lock, which see).** F, figs. 1700-2.

**Bell-crank driving-wheel brake (American Brake Co.'s brake-gear).** Figs. 363-5. One of the four styles of driving-wheel brake-gear manufactured by the company referred to, taking its name from the peculiar manner of applying the brake power, as shown in the illustration.

**Bell-crank pin (steam driver-brake).** 18, figs. 363-5.

**Bell-punch.** An instrument for punching a hole on a recording slip of paper or tickets, so as to register the fares collected by a conductor. The instrument has a bell attached which is rung every time a fare is recorded by punching the paper or ticket. The bell is intended to indicate or announce to the passengers that the conductor has recorded the fares collected. These instruments are made in a variety of forms. The punching of the slip is now usually omitted, the device being then simply

an *alarm register*, often made of large size and attached to the side of the car.

**Bell-rope.** A *Bell-cord*, which see.

**Bell's exhaust hopper-ventilator.** Figs. 1097-8. An attachment placed underneath the *floor-pipe* of a *closet-hopper*, on the under side of a passenger car to produce a downward draft through the hopper when the car is in motion. The attachment is of a concave conical form, which by the motion of the train in either direction causes the air to pass downward through the floor-pipe by creating a partial vacuum at the base.

**Bell-strap (street-car).** 98, fig. 1843. A leather strap which extends along the under side of the rafters, from a signal bell on one end of the platform to one on the other end; used by the conductor to signal to the driver, and by the driver to signal to the conductor.

**Bell-strap bracket.** A *Bell-strap guide*, which see.

**Bell-strap guide (street-car).** 99, figs. 1843-4, figs. 1847-50. A metal loop or bracket attached to the ceiling of a street car for carrying a signal-strap. They are frequently provided with rollers and have either *screw-tops* or *flanges*.

**Belt-moulding.** 97', figs. 179-80. A moulding passing entirely around the interior of the passenger-car directly above the windows, in the middle of the wide board called the inside lining.

**Belt-rail.** 65, figs. 155-190; 19, fig. 1844. A strip of wood, on the outside of a passenger or street-car frame below the windows, extending the whole length of the car-body and attached to each post. The *upper belt-rail*, 82, figs. 175-6, is a similar strip directly above the window.

**Belt-rail band (street-cars).** 20, figs. 1843 and 1845. An iron band on the outside of a belt-rail covering the joint of the latter with the panel. It extends around each corner of the car to the door-posts.

**Belt-rail cap.** 81, figs. 175-6 and 179-80. A thin strip of wood nailed to the top of a belt-rail, and which forms a seat for the window-sill.

**Bend (for iron pipes).** Figs. 1337 and 1341. See *Return-bend*. They are distinguished as *close* and *open* return-bends.

**Bent ladder-round.** Figs. 656-7; 59', fig. 96. The lower round of the ladder of box cars having an angle turned up at the inside for the safety of trainmen, to prevent the foot slipping off the ladder-round. The use of such

- rounds has been recommended by the M. C. B. Association. See figs. 656-7 and *Ladder-round*.
- Berth.** 1, 2, figs. 676-7. A bed in a *Sleeping-car*, which see; also, the shelf or support on which the bed rests. There are two such beds in the space occupied by two double seats, which is called a *section*. The *lower berth* is made upon the seats and the upper one on a shelf, which can be raised or folded up out of the way in day-time, as shown at 3, 3. See *Lower berth*. *Upper berth*.
- Berth-arm.** A *Berth-brace*, which see.
- Berth-bolt.** See *Berth-latch bolt*.
- Berth-brace.** 4, figs. 676-81. A metal rod, chain or wire rope attached to the side and near the top of a sleeping-car, and at the other end to the outer edge of a berth, which is supported by the brace. When a metal rod is used, it usually has a joint so that it can fold up like an ordinary two-foot rule, when the berth is raised up.
- Berth-brace eye.** 5, figs. 676-81. A metal plate with suitable lugs for fastening the brace to the top of the car, or to the berth. The brace is attached to the lugs by a pin, and the plate is screwed fast either to the side of roof of the car or to the berth. The former is called a *Berth-brace upper-eye*, and the latter a *Berth-brace lower-eye*.
- Berth-bracket.** Figs. 12, 36, etc. A bracket on which an upper-berth of a sleeping-car rests when lowered and the bed is made and in use.
- Berth-catch** (emigrant sleeping-berths). H, figs. 682-5 and 1289-91.
- Berth-chain.** 6, figs. 676-8. An equivalent for a *berth-spring rope*, which see.
- Berth-chain pulley.** 7, fig. 678. A pulley attached to the roof of a sleeping-car, over which a berth-chain runs.
- Berth-curtain.** 13, fig. 678. A curtain hung in front of a sleeping-car section to hide the occupants from sight. In ordinary sleeping-cars a single curtain covers both berths. In the Mann boudoir cars, figs. 680-1, there are separate *upper* and *lower* curtains for each berth.
- Berth-curtain hook.** A metal hook attached to a berth-curtain, and by which the latter is hung on a rod above the berths; usually covered with leather to prevent rattling.
- Berth curtain-rod.** 14, figs. 679-81. A rod usually made of metal tubing, fastened above a section of a sleeping-car and to which a *berth-curtain* is hung.

- Berth curtain-rod acorn.** Figs. 1269-73. See *Berth curtain-rod tip*.
- Berth curtain-rod bolt.** Figs. 1267; 1, 1271-2. A small vertical bolt, usually tipped with an acorn, fastening the *curtain-rod* in the *coupling* on the *bracket*.
- Berth curtain-rod bracket.** 15, figs. 676-81, 1271-2. A metal bracket attached to the deck side of a sleeping-car, which forms a support for a berth curtain-rod. Such brackets usually have a coat and hat hook attached to them. A *hanger*, fig. 1265, is sometimes used as a substitute for a bracket at certain points.
- Berth curtain-rod coupling.** 1, figs. 1271-2, 1265. A fastening by which a berth curtain-rod of a sleeping-car is secured to a bracket. It usually consists of a bolt or screw.
- Berth curtain-rod hanger.** Fig. 1265. See *Berth curtain-rod*.
- Berth curtain-rod socket.** Figs. 1270 and 1274. A metal flanged ring which is fastened to some part of a sleeping-car to carry the berth curtain-rod, also called *berth curtain-rod bushing*.
- Berth curtain-rod tip, or acorn.** Figs. 1267-9, 1273. See *Acorn*.
- Berth fixtures, etc.** Figs. 1231 and 1260.
- Berth-handle.** A *Berth-latch handle*, which see.
- Berth head-board.** 16, figs. 676-81. See *Head-board*.
- Berth-hinge.** Figs. 1237-40. A hinge or joint by which the back edge of an upper berth of a sleeping-car is attached to the side of a car. They are distinguished as *loose* and *fast*.
- Berth-hinge bracket** (emigrant sleeping-berths). Figs. 682-5.
- Berth-hinge bushing.** Fig. 1238. A hollow metal socket in which the spindle of a loose *berth-hinge* works.
- Berth-latch.** 12, figs. 676-81, 1251-4. A spring bolt for holding the upper berth of a sleeping-car up in its place when not in use. To obviate the danger of the berth shutting up in case of overturning of the car, the *safety-berth rope* and attachments, figs. 676-8, are used, but *safety-berth latches*, figs. 1261-4, have recently been introduced to obviate the necessity of using a safety-rope. See *Safety berth-latch*.
- Berth-latch bolt.** Fig. 1253. The bar or pin of a berth-latch which engages in a corresponding strike-plate or keeper, to hold the berth up.



Berth-latch face-plate. 1, fig. 1252.  
 Berth-latch handle. 12, figs. 677-81, 996, 1252.  
 Berth-latch keeper. Fig. 1254. Also called *Strike-plate*, which see. See *Berth-latch bolt*.  
 Berth-latch lever. Fig. 1255. The part by which the *berth-latch handle* operates the *berth-latch bolt*.  
 Berth-latch shell. A metal covering made in the form of a sea-shell for covering and protecting the handle of a berth-latch in a sleeping-car.  
 Berth-rest (double). (Emigrant sleeping-berths.) M, figs. 682-5, 1149-53, 1286-7. A shoulder carried upon the upright *berth-posts* as a support to the outer edge of the upper berths.  
 Berth-rest (end). (Emigrant sleeping-berths.) N, figs. 682-5, 1149-53, 1285.  
 Berth-rest (upper). Figs. 1235-44.  
 Berth-rest (upper). (Mann boudoir car.) 14, figs. 680-1.  
 Berth-rest (upper). (Emigrant sleeping-berths.) L, figs. 682-5.  
 Berth-rest bracket (upper.) Fig. 1236.  
 Berth-rest plate. (Emigrant sleeping-berths.) K, figs. 682-5.  
 Berth-rest plate (upper). (Mann boudoir car.) 11, figs. 680-1.  
 Berth safety-latch handle, in place attached to car. 42, fig. 679. See *Safety berth-latch*.  
 Berth-lock. A *Berth-latch*, which see.  
 Berth-numbers. Fig. 1233. Figures or numbers, usually made of metal or porcelain, for numbering the berths or sections of sleeping-cars. They are now often of inlaid wood.  
 Berth-rest. See *Upper-berth rest*.  
 Berth safety-rope. 11, figs. 676-81, 1246-7. A wire rope fastening the upper berth of a sleeping-car to the fixed arms of the lower berth, to prevent accidental closing up on the upper berth in case of overturning of the car. The rope is fastened to the upper berth by a *berth safety-rope fastener* and to the lower berth by inserting a knob into a *berth safety-rope holder*. This whole attachment, however, is now passing out of use since the introduction of *safety berth-latches*, which see, figs. 1261-4, which are so constructed that they cannot snap shut accidentally.  
 Berth safety-rope fastener. Figs. 1246-7. See *Berth safety-rope*.

Berth safety-rope holder. Fig. 1247. See *Berth safety-rope*.  
 Berth safety-rope knob. See *Berth safety-rope holder*.  
 Berth-spring. 8, figs. 676-81, figs. 1249-50 and 1251. A spring usually made in a spiral form, like a watch spring, coiled within a device called the *berth-spring fusee* and attached to the upper berth of a sleeping-car by a *berth-chain* so as to counteract the weight of the latter and make it easy to raise and lower it. The *berth-spring* is now often concealed behind boarding at the side of the car.  
 Berth-spring frame. 9, figs. 676-81; 1, figs. 1249-51. A metal support which holds a berth-spring and fusee.  
 Berth-spring fusee. 2, figs. 1249-51. See *Fusee*.  
 Berth-spring lug, or clip. Fig. 1250. The means by which the end of a berth-chain is fastened to the upper berth.  
 Berth-spring rope. 10, figs. 676-81, and 3, figs. 1249-51. A cord, usually made of wire, which is connected to an upper berth of a sleeping-car at one end, and to the berth-spring at the other, and by which the tension of the spring is transmitted to the berth, thus counteracting its weight. Instead of the rope a *pitch-chain* (which see) is sometimes used.  
 Berth-stop (emigrant sleeping-cars). Fig. 1297. A bearing-plate carried on upper berth at K, figs. 682-5, to afford a bearing on the *berth-rest M*.  
 Berth striker-plate. A *Berth-latch keeper*, which see.  
 "Best" sun-burner. Fig. 888. See *Sun-burner*.  
 Beveled-bushing. Figs. 706-8. See *Bell-cord bushing*.  
 Beveled-rack (Ormsby sash-balance, which see). Figs. 1704-6. A rack, which see, with a slope sidewise and outward to check rattling of the sash.  
 Beveled-washer. Fig. 1874. A washer used to give an even bearing for rods which stand at an acute angle to the surface on which the nut or bolt head bears. Sometimes two such washers which come near together are cast in one piece, and are then called *double-beveled washers*. See *Triangular washer*.  
 Bezel. "A term applied by watchmakers and jewelers to the groove and projecting flange or lip by which the crystal of a watch is retained in its setting. An *ouch*." —*Knight*. Hence, *Globe-bezel* (Pintsch gas-burner). Fig. 816.  
 Bibb. A curved nozzle for conveying liquids and chang-

ing the direction of their flow usually from a horizontal to a vertical current. Hence—

**Bibb-cock.** Figs. 1591-3. Literally, a cock with a curved nozzle or spout, but commonly restricted to a cock with a plain valve without springs, moved by the hand only.

**Bi-colored signal lantern** (Burrell). Figs. 972-3. See *Burrell reversible signal lantern*.

**Bissell heater.** Figs. 1349-1404. One of the hot-air heaters, taking in cold air by a *wind-scoop* and distributing it by pipes along the floor. Four different styles are manufactured, increasing in elaborateness from a plain stove, as explained with the engravings.

**Bissell stop-key journal bearing.** Figs. 2005-9. One with a projecting shoulder on the journal-bearing key to take up the end-thrust, so as to dispense with a collar. See *Journal bearing*. Also called *stop-wedge journal-bearing*. See *Journal-bearing key*.

**Bit** (of a key). Figs. 1029, 1178, etc. The part of a key which enters the lock and acts upon the bolt and tumblers. The bit consists of the *web* and *wards*. The *web* is the portion left after the wards are cut out. The *wards* (of a key) consequently are those parts of the bit which *are not there* and fit over the *wards* of a lock which see. Some bits, as in fig. 1178, have no wards.

**Bit** (of a padlock). E, figs. 1029-30. The forward end of the sliding-bolt, which engages with the shackle in the act of locking.

**Bit or jaw-bit** (passenger car trucks). 77, figs. 1955-73. A short bar closing the mouth of the jaw of a pedestal after inserting the journal-box.

**Blackstone car-coupler.** A form of platform invented by Mr. T. B. Blackstone, president of the Chicago & Alton Railroad, and used only on that road. It has projecting bars, which engage with the opposite platform and accomplishes somewhat similar ends to the Janney or Miller platforms in a manner less generally satisfactory.

**Blake butt.** An indefinite term, meaning in general a plain cast-iron butt-hinge, of somewhat more than ordinary quality, having a washer, but no acorns nor screw-pin, as in fig. 789.

**Blank hinge.** Fig. 790. A hinge which permits the door to swing open in either direction. It is intended as a substitute for one of a pair of *double-acting spring hinges*, which see, as being lighter and cheaper.

**Bleeding valve** (for Westinghouse brake). Fig. 326; 18, figs. 324-5. Another term for the *cylinder release-cock*. In popular language, the operation of releasing the brake pressure by operating the *bleeding-valve* or *release-cock* of the brake cylinder without going through the usual process of admitting pressure to the brake-pipe is termed *bleeding the brakes*. It is the only method of release when the engine is disconnected.

**Blind.** Figs. 155-185, etc. A *Window-blind*, which see. They are sometimes *single*, but usually *double*, and then distinguished as *lower* and *upper*. *Flexible window-blinds* (Paul and Wilson, which see, figs. 1645-7) are also in use.

**Blind lifts, bushing bolt, etc.** Figs. 1607-9, 1663-82. See *Window-blind lift*, etc.

**Blizzard.** A fierce storm with high wind. Hence the trade name *blizzard signal-light*, figs. 964-6, to designate one of extra quality, with careful provisions to prevent extinction by wind. See *Signal-light*.

**Block.** 1. "A heavy piece of timber or wood, usually with one plane surface; or it is rectangular and rather thick than long."—*Webster*.

2. Fig. 1888. "A pulley or system of pulleys mounted on its frame or shell, with its band or strap. A block consists of one or more pulleys or sheaves, in a groove of which the rope runs, fastened in a shell or frame by pins, on which they revolve; of a shell or frame inclosing the pulley or pulleys; and of a strap or band, consisting of a rope, encompassing the shell, and attached by an eye of rope or a hook to some object."—*Ed. Ency.*

The interior wheels are termed *sheaves*, which latter term is often used to designate the whole block or pulley, but incorrectly. A *snatch-block* is a block with only one sheave and with an opening at the side for the ready insertion and removal of the rope. Blocks without this opening, however, are sometimes loosely termed *snatch-blocks*.

See <i>Body-bolster spacing-block.</i>	<i>Stop-block.</i>
<i>Body-bolster truss-block.</i>	<i>Bumper-block.</i>
<i>Brake-block.</i>	<i>Centre plate block.</i>
<i>Buffer-block.</i>	<i>Dead-block.</i>
<i>Brake-cylinder block.</i>	<i>Swing-hanger friction block.</i>
<i>Distance-block.</i>	<i>Transom bearing-block.</i>
<i>Floor-timber distance-block.</i>	<i>Transom truss-block.</i>
<i>Follower-plate block.</i>	<i>Truck-bolster guid</i>
<i>Guide-block.</i>	



*Packing-block.*  
*Safety-beam block.*  
*Spring-block.*  
*Stirrup-block.*

*block.*  
*Truck-bolster truss-*  
*block.*  
*Truss-block.*

**Block and tackle.** A general term applied to a pair or more of pulleys and accompanying rope. Also termed *fall and tackle*, or simply *tackle*.

**Block car.** A car generally attached to wrecking trains, behind the wrecking car proper, for carrying blocking, ropes, chains and other tools. Usually a common box car, sometimes fitted up with bunks.

**Blocking.** 20, fig. 186. A mode of securing together the vertical angles of woodwork by blocks of wood glued or nailed in the inside angle. The method is largely used in every form of carpentry, where great strength is not required in the joint.

**Blocking-strip.** See *Floor blocking-strip*. 204, figs. 97-101.

**Blue-light signal-holder.** Fig. 1043. A device carried on many trains for giving night signals. It is so constructed that pushing in a small piston ignites the blue light.

**Board.** "A piece of timber sawed thin, and of considerable length and breadth, compared with the thickness, used for building and other purposes."—*Webster*.

See <i>Brake foot-board.</i>	<i>Letter-board.</i>
<i>Deck soffit-board.</i>	<i>Roof-boards.</i>
<i>Eaves fascia-board.</i>	<i>Roof running-board.</i>
<i>Fender-board.</i>	<i>Running-board.</i>
<i>Head-board.</i>	<i>Seat-back board.</i>
<i>Inside-cornice fascia-board.</i>	<i>Soffit-board.</i>
<i>Inside-cornice sub-fascia board.</i>	<i>Splash-board.</i>
	<i>Tread-board.</i>

**Board roofs (freight-cars).** Single, figs. 664-5. Double, fig. 666. A very indefinite term, usually meaning either one with a double layer of boards only, with or without painted canvas or other packing, or a single layer of boards covered with sheet metal. The Winslow and other roofs have hoarding *over* the metal sheets.

**Boarding-car.** A car fitted up for cooking and serving meals to men at work on the line of a road.

**Bob-tail street-car.** Fig. 1840. A term used to designate a street-car with a platform in front only and a small step behind. Such cars are usually drawn by one horse only.

**Body (of a car).** The main or principal part in or on which

the load is placed. American cars for steam railroads usually consist of a body carried on two trucks. Street-cars are usually carried on four wheels only.

2. (Of a valve cylinder, etc.). The main or principal part, to which the other parts are attached, as *cylinder-body*, etc.

**Body-bolsters.** Figs. 215-26; also 12, figs. 82-141; 10, figs. 155-180; of iron, A6, figs. 121-5; A3, figs. 144-9. Cross-beams attached near the ends of the under side of a car-body which is supported on two trucks. The body centre-plate and side-bearings, which rest on the truck, are fastened to these bolsters. Such beams are made of wood, or of iron trussed, or of wood and iron combined. A body-bolster is sometimes called *body-transom*, or simply *transom*, but the term body-transom is more generally applicable, if used at all, to the *needle-beams* passing from side to side of the car between the trucks; also known as *cross-frame tie-timbers*, or *cross bearers*. A part somewhat analogous to a body-bolster is the *bunk* of logging-cars, figs. 1727-30; but this rests above a reach connecting the trucks, and is the only car-body to sustain the loads. The body-bolsters of passenger-cars are sometimes very elaborate structures, as the *double iron body-bolster* and *Snow body-bolster*, figs. 219-23, the latter being the equivalent of a double iron body-bolster, but in the form of an X. Iron body-bolsters are in the form of a truss, the top member being known as the *tension-bar* and the bottom as the *compression-bar*, the two being held apart by small castings called *body-bolster thimbles*.

**Body-bolster compression-bar.** 1, fig. 217. See *Body-bolster*.

**Body-bolster spacing-block.** 12', figs. 93-6, 113-5. See *Body-bolster*.

**Body-bolster tension-bar.** 2, fig. 217. See *Body-bolster*.

**Body-bolster thimble.** 3, fig. 217. See *Body-bolster*.

**Body-bolster truss (iron 6-wheel truck).** F, figs. 1971-3. See *Body-bolster*.

**Body-bolster truss-block.** 4, fig. 215; 15, figs. 88, 135; 13, figs. 158-178. A block of wood or distance-piece, on the top of a wooden body-bolster, between the centre floor-timbers and underneath the bolster truss-rods.

**Body-bolster truss-rod.** 13, figs. 132-8; 11, figs. 158-85; 6, fig. 215. A rod which lies parallel with and passes

above the centre of the bolster over the *truss-rod bearing* so as to form a truss; generally two or more are used for each bolster.

**Body-bolster truss-rod bearing.** 5, figs. 215, etc. See *Body-bolster truss-rod*.

**Body-bolster truss-rod washer.** 14, figs. 82-6; 12, figs. 155-185; 7, fig. 215. An iron bearing-plate on the end of a body-bolster; often made to take two or more rods.

**Body-brace.** 33, figs. 84-105; 51, figs. 155-165. An inclined beam or strip of timber in the side or end frame of a car-body, which acts as a brace. A substitute for body-braces as well as for truss-rods is the *Challender truss*, fig. 185b, which see. A *compression beam brace*, 2, fig. 644, answers to the definition of a body-brace, but is a long brace, constituting with the *compression-beam* a single truss or arch from bolster to bolster. A *body-brace* is an oblique brace in one of several panels included in this space. See *Body-counterbrace*. *End body-brace*, 35, figs. 85-104, and *Side body-brace*.

**Body brace-rod.** 34, figs. 89, 93; 52, figs. 177-8. An inclined iron rod in the side or end of a car-body frame, which acts as a brace. They are distinguished as *end* and *side body brace-rods*. A *brace straining-rod* is a short vertical rod in the side of a passenger car under the window.

In figs. 159-60, 167 should read *inverted body truss-rod*, or *hog-chain rod*, and not *body brace-rod*.

**Body centre-plate.** 8, figs. 215-7; 17, figs. 182-92; 15, figs. 156-81. The upper of the two *centre-plates*, which see, through which the *king-bolt* or *centre-pin* passes.

**Body check-chain eye.** 19, figs. 158-85. An eye-bolt or clevis for fastening a check-chain to the car-body. See also *Truck check-chain eye*.

**Body check-chain hook.** An iron hook on the *check-chain* which enters into the *check-chain eye*.

**Body counterbrace.** 37, figs. 82, 84, 132, 136; 55, figs. 135, 161-5; 3, fig. 644; 2, fig. 645. A brace in the side frame of a car-body between the bolsters and end of the car. These braces are inclined in a direction opposite to those between the bolster and centre of the car. Sometimes, as in fig. 159, counterbraces are inserted in the central portion of the car between the two bolsters. They are then termed *centre counter-braces*. See *Counter-brace* and *framing*.

**Body counterbrace rod.** 37', figs. 82-101; 56, fig. 1778.

An inclined iron rod in the side-frame of a car-body, between the bolster and the end of the car. The body counterbrace-rod is sometimes a continuous rod running from one end of the car to the other over the supports resting on the body-bolster, as 167, fig. 159. It is then, more properly speaking, an *inverted truss-rod* or *hog-chain rod*, which see. Also called *continuous body-brace rod*.

**Body counterbrace tie-rod.** 176, fig. 93. An erroneous reference. Name should read *Inside-lining stud*.

**Body-cushion** (English). 186, figs. 204-5. See *India-rubber body-cushion*.

**Body hand-rail.** 44, figs. 155-183; 113, figs. 1843-5. An iron rod or bar attached to the end of passenger cars for persons to take hold of in getting on or off the cars; not to be confused with *Platform-rail*, which see.

**Body-knee** (English). 82, figs. 116-9. No American equivalent. A heavy wrought-iron knee, securing the sides of the body to the *under-frame*, and keeping them at right angles to one another.

**Body-post** (freight-car bodies). 42, figs. 83-142. An upright timber which is framed into the sill and plate of a freight car. The body-posts and *corner-posts* form the vertical members of the side-frame of a car-body. In passenger cars such posts are called *Window-posts*, which see.

**Body-post-pocket.** 42', figs. 93-6; 35, figs. 109-12, etc. See *Pocket*.

**Body queen-post.** 22, figs. 155-6, 161-4. An iron rod, bar, or casting, on the under side of a car-body and against which the *body truss-rods* bear. It is often stiffened laterally by a *body queen-post stay*. See also *Queen-post*.

**Body queen-post stay.** 2, fig. 224; A, fig. 163. See *Body queen-post*.

**Body side-bearings.** 16, figs. 83-138; 14, figs. 163-185. The upper one of the two *side-bearings*, which see, attached to the body-bolsters.

**Body-spring.** A *Bolster-spring*, which see.

**Body transom.** 22, figs. 82-92, etc. A name sometimes given to the *needle-beams* or *cross-frame tie-timber*, which see, bolted to the under side of the sills.

**Body truss-rod.** 19, figs. 82-136; 20, figs. 155-181, 229. A long rod under a car-body to truss it, and prevent it from sagging in the centre. This rod is nearly always



continuous from end-sill to end-sill, in well-designed modern freight cars, but sometimes, as in fig. 77, it is attached to a *truss-rod iron* on or near to the body-bolster. In passenger cars the use of the truss-rod iron, 24, figs. 159, etc., is much more common, although the tendency is to use a continuous rod, as in figs. 155, 181. The truss-rods are distinguished as *centre* and *side* or *outside* body truss-rods. They are usually four but sometimes only two in number. See also *Inverted body truss-rod*.

**Body truss-rod bearing.** 21, figs. 82-136. A cast or wrought iron plate, on the under side of a truss-block or of a cross-frame tie-timber, serving the purpose of a *Body queen-post*, which see.

**Body truss-rod saddle.** 20, figs. 88-9, 113-5, etc.; 21, figs. 155, etc. A block of wood or casting which forms a distance-piece on *top* of a bolster, and on which a continuous body truss-rod bears. Properly speaking, a *saddle* means a common bearing for a pair of rods with a central support, as figs. 1744, 1756, but it is not now restricted to such use.

**Bogie** (English). A swiveling *car-truck*, which see. All American eight-wheeled cars and coaches are what are termed in England *bogie carriages*, or *wagons*.

**Bogie carriage** (English). A vehicle for passenger service recently much used on the fastest trains. The body is from 40 to 54 feet long, divided into compartments, with side doors, and seating from 30 to 80 passengers. It is carried on four or six wheel trucks. See also *Carriage*.

**Bogus-plate** (refrigerator-cars). A horizontal timber attached to the posts on the inside of the car, a short distance below the plate. The *bogus-plates* support horizontal cross-timbers called *meat timbers* or *hanging bars*, to which hooks are attached for hanging meat.

**Boiler** (Johnson heater). 27, fig. 1472. See engravings of stoves and heaters generally, for similar parts.

**Boiler wagon** (English). A six or eight wheeled car having two bogies or trucks at the ends with a drop-down platform between them, adapted to carry any exceptionally heavy or bulky load, such as a boiler, a heavy piece of machinery or a portable engine. It is mechanically an American freight car with the middle portion dropped down to near the level of the rails.

**Bolster.** Figs. 215-25, etc. A cross timber or trussed beam on the under side of a car-body (*Body-bolster*,

which see), and in the centre of a truck (*Truck-bolster*, which see). The bolsters carry the body and truck *centre-plates*, the body-bolster resting on the truck-bolster. Special forms for passenger cars are *Compound-bolster*, *Iron body-bolster*, *Double iron-body-bolster*, which see.

Truck-bolsters are either *Swing-bolsters*, which see, admitting of lateral motion to ease off shocks, or *rigid* bolsters, which permit no lateral motion. All passenger trucks have swing-bolsters. Practice as to freight-car truck-bolsters is about evenly divided. At the Master Car-Builders' Convention, 1884, the vote in favor of adopting the swing-bolster for a standard freight-car truck was 32 to 30.

**Bolster-bridge** (six-wheel truck). 62, figs. 1969-70. A *Side-bearing bridge*, which see.

**Bolster distance-block.** A<sup>7</sup> figs. 121-5. The same as a *body-bolster thimble*. 3, fig. 217-9.

**Bolster jack-screws** (wrecking cars). S, fig. 148. Jack-screws attached to the spring-plank for the purpose of taking the load off the springs and making the entire truck and car body one rigid structure when the derrick of the wrecking-car is in use. *Tongs* or *crabs*, which see, and detached jack-screws are used to accomplish the same end, as figs. 80, 144.

**Bolster-plates** (passenger car trucks). Fig. 225. Wrought-iron plates bolted to the sides of wooden body-bolsters to strengthen them.

**Bolster-springs.** 80, figs. 1907-68 and 2049-2106. The main springs of a car, carried on the *spring-plank* and supporting the *truck-bolster* on which the weight of the car-body rests.

**Bolster-spring cap.** 75, figs. 1915-16, 1957-67. See *Spring-plate*.

**Bolster-spring seat.** 74, figs. 1915-16, 1957-67. See *Spring-plate*.

**Bolster truss-block.** A timber serving as a distance-piece to fill a vacant space between the *bolster* and the *centre-plate*. There are two: a *Body-bolster truss-block* and a *truck-bolster truss-block*, which see. Both are only occasionally used.

**Bolster truss-rod.** See *Body-bolster truss-rod*. *Truck-bolster truss-rod*.

**Bolster truss-rod washer.** See *Body-bolster truss-rod washer*. *Truck-bolster truss-rod washer*.

**Bolt.** 1. A pin, rod or bar of metal used to hold or fasten

anything in its place ; ordinarily a *bolt* has a head on one end and a screw and nut on the other, while a *rod* has a nut on both ends, as shown in figs. 1865-76, etc.

Various forms of bolts, which see for further definition, are as follows:

<i>Carriage-bolt</i> , fig. 1867.	<i>Key-bolt</i> , fig. 1871.
<i>Eye-bolt</i> , figs. 1872-1797.	<i>Lug-bolt</i> , fig. 1869.
<i>Jaw-bolt</i> , fig. 1796.	<i>Machine-bolt</i> , figs. 1865-6.
<i>Joint-bolt</i> , fig. 1876.	<i>Strap-bolt</i> , or U-shaped bolt, fig. 1870.

For bolts whose names are derived from the purpose for which they serve, see:

<i>Box-bolt</i> .	<i>Journal-box-cover bolt</i> .
<i>Brake safety-chain bolt</i> .	<i>King-bolt</i> (or centre-pin).
<i>Column-bolt</i> .	<i>Piston-follower bolt</i> .
<i>Discharge-valve stop-bolt</i> .	<i>Reversing-valve plate bolt</i> .
<i>Draft-bolt</i> (Janney).	<i>Stake-pocket U-bolt</i> .
<i>Drawbar-bolt</i> .	<i>Stop-bolt</i> .
<i>Hub-bolt</i> .	<i>Tire-bolt</i> .
<i>Journal-box bolt</i> .	

2. (Locks and latches.) A bar which enters the keeper or strike-plate and effects the lock.

See <i>Berth-latch bolt</i> .	<i>Door-sash bolt</i> .
<i>Cupboard-bolt</i> .	<i>Door-sash-lock bolt</i> .
<i>Door-latch bolt</i> .	<i>Seat-lock bolt</i> .
<i>Door-lock bolt</i> .	<i>Sofa-bolt</i> .

3. Figs. 753-61, etc. A *door-bolt*, which see, moved in slides directly by the hand to fasten an opening. See also:

<i>Barrel door-bolt</i> .	<i>Head-board bolt</i> .
<i>Flush-bolt</i> .	<i>Window-blind bolt</i> .

**Bolt drawbar.** Figs. 395-449, etc. A drawbar to which the draw-spring is attached by a bolt passing through it. Also called *Spindle drawbar*.

**Bolt-stop** (Seat-lock). 5, figs. 1176-7. A small pin passing through the bolt to check excessive withdrawal.

**Bonnet** (passenger cars). A *Platform-hood*, which see.

**Boom** (of a derrick or crane). 6, figs. 77-78 ; B, fig. 145 ; D<sub>2</sub>, figs. 151-3. Also called *jib*. The main inclined compression member carrying the hoisting gear and abutting at its foot against a *boom-shoe* or directly against the mast. Its upper end is supported by stay-rods or tension-rods which, in a crane, are of fixed length, and, in a derrick, of varying length, capable of adjustment. See *Derrick*.

**Boom-cap clevis** (of a derrick or crane). L, figs. 151-3.

A clevis, which see, sometimes attached to the upper end of the boom, to which the fixed end of the *hoisting-rope* is attached. In other cases, as at 4, figs. 77-8, the clevis for this purpose is carried on the hoisting-block.

**Boom-sheave** (of a derrick or crane). E, figs. 151-3; also 5, figs. 77-8. A sheave carried at the upper extremity of the boom over which the hoisting chain passes.

**Boom-shoe** (of a derrick or crane). 16, figs. 77-78 ; F<sup>2</sup>, figs. 151-3. A casting carried at the foot of the mast and constructed so as to be able to revolve against the boom base. It is supported by *boom-shoe rods*.

**Boom-shoe rods** (of a derrick or crane). 16, figs. 77-8 ; F, figs. 151-3. Rods attached to the *head-block* or cap at the top of the mast and supporting the boom-shoe.

**Boom-shoe rollers** (of a derrick or crane). R, figs. 151-3. Rollers at the foot of the mast upon which the boom-shoe revolve.

**Boss**, or hub (of a steel-tired wheel). Figs. 2151-2180. The central portion through which the axle passes. *Boss* is the usual English term, but little used in the United States.

**Bottle-breaking head** (Bahcock fire extinguisher, which see). Fig. 1044. It breaks the acid-bottle by screw-pressure.

**Bottom**. "The lowest part of anything ; as the bottom of a well, vat, or ship."—*Webster*.

See <i>Alcove-bottom</i> .	<i>Water-bottom</i> .
<i>Candle-lamp bottom</i> .	<i>Fire-proof bottom</i> .
<i>Drop-bottom</i> .	<i>Lamp-bottom</i> .
<i>Extreme bottom</i> .	<i>Seat-bottom</i> .

**Bottom-arch-bar**. An *inverted arch-bar*. The *pedestal tie-bar* is sometimes called bottom arch-bar, as in fig. 1788. See *Arch-bar*.

**Bottom-chord** (of trusses). See *Lower-chord*. Neither term is regularly used to designate any part of car trusses, but the *side-sills* are bottom chords in trussed side-frames.

**Bottom cross-piece** (English). 93, figs. 205-206. The transverse-piece in the *under framing*, which see, supporting the floor and partition. Also called *bottom cross-bar*.

**Bottom cylinder-head**, (Westinghouse driving-wheel brake). 4, figs. 308, 314-5. A circular cast-iron plate or cover for the lower end of the cylinder. The piston-rod works through it.



**Bottom door-panel** (English). 128, fig. 205. The lowest panel on the outside of the door of a carriage.

**Bottom door-rail**. 5, fig. 370. The lower transverse piece of a *Door-frame*, which see.

**Bottom door-track**. 66, figs. 72, 82, 86, 132, 136, 134, 138. A door-track below a sliding-door. Usually a metal bar. Sliding-doors are usually provided with rollers or slides which rest on the track. Freight-car doors usually slide on a *top door-track*, which see. See also *Door-hanger* and *car-door hanger*.

**Bottom end-piece** (English). 92, figs. 205 and 206. American equivalent, *end-sill*. The transverse end-piece in the under frame of a passenger vehicle.

**Bottom light-rail** (English). 102, figs. 204, 205. A part of the body framing of a carriage, forming the bottom of the window opening.

**Bottom of case** (Gouge heater, which see). 83, fig. 1409.

**Bottom panel batten** (English). 105, fig. 205. American equivalent, *furring*. In a carriage, a part of the body framing used to stiffen the *panel*, which is pinned to it. See *Bottom-side panel*.

**Bottom-rail** (of a sash or door). 147, figs. 158-85; 5, fig. 370. The lowermost horizontal bar or member of a frame.

**Bottom-ratchet** (of drum for Creamer brake, which see). 15, fig. 263.

**Bottom-side** (English). 91, figs. 204-207. The lower longitudinal framing of the body of a passenger vehicle.

**Bottom side-and-end knee** (English). 144, fig. 206. A wrought-iron knee joining together the side and end members of the bottom of the body framing of a carriage.

**Bottom side-panel** (English). 123, fig. 205. The lower panel on the outside of the body of a carriage.

**Bottom stove-plate** (Baker heater). 1, figs. 1301, 1302. An iron casting shaped somewhat like a dinner plate.

**Bottom stove-plate** (Spear heater). 14, figs. 1486-90, 1500. A circular casting which rests on the floor of a car. See also *Fire-proof bottom*, fig. 1524.

**Boudoir** (Boud-wärr, Fr.). A luxurious private parlor for a lady. Hence—

**Boudoir sleeping-car**. Figs. 50, 212, 680-1. See *Mann boudoir sleeping-car*.

**Bow**. See *Platform-hood bow*.

**Bowl**. 2, fig. 1570, etc. See *Basin*.

**Box**. See *Journal-box*, figs. 1997-2020. *Wheel-box* (street cars).

**Box-bolt** (diamond trucks). 108, fig. 1925. The bolts holding the journal-box in place. More properly, *journal-box bolts*.

**Box-car**. Figs. 1-43, 82-101. The most common form of American freight car, with roof and sides inclosed to protect its contents. A few *four-wheeled box cars*, fig. 4, and a few *box stock-cars*, figs. 8-9 are built. The present tendency is to continually increase their length and capacity. They are usually lined for half their height with *inside lining*, and provided with an interior grain-tight *grain-door*. See *Car*. *Freight car*.

**Box-cover**. See *Journal-box cover*.

**Box-cushion**. Figs. 1205-23. A cushion for passenger car seats made on a wooden frame. In distinction from a *squab cushion*, now little used, which is a loose pad on the seat. Box-cushions are sometimes stuffed with hair or other elastic material alone, but usually steel springs are used in addition. Fig. 1206 shows a frame for a box-cushion.

**Box-guide**. See *Journal-box guide*.

**Box-lid**. Figs. 1997-2020. See *Journal-box cover*. *Fletcher* and *Hewett journal-box lid*.

**Box-packing**. *Journal-packing*, which see.

**Box-room** (on axle). The *dust-guard seat*, which see.

**Box-steps**. Fig. 686. Passenger car steps made with wooden stringers or sides. Ordinarily called the *platform steps*.

**Box stock-car**. Figs. 8-9. An ordinary box car with large grated openings for ventilation, but excluding rain. Little used except for horses. See *Stock car*.

**Brace**. 8, fig. 2182, and figs. 82-185. An inclined beam, rod or bar of a frame, truss, girder, etc., which unites two or more of the points where other members of the structure are connected together, and which prevents them from turning about their joints. A brace thus makes the structure incapable of altering its form from this cause, and it also distributes or transmits part of the strain at one or more of the joints toward the point or points of support, or resistance to that strain. A brace may be subjected to either a strain of compression or tension. In the former case, in car construction, it is called simply a *brace*; in the latter it is called a *brace-rod*. They are called *right* or *left handed*, according to the

inclination of their top to a person standing facing the car.

See <i>Berth-brace.</i>	<i>Corner-post brace.</i>
<i>Body-brace.</i>	<i>Door-brace.</i>
<i>Brake-lever bracket</i>	<i>End body-brace.</i>
<i>brace.</i>	<i>Floor-timber brace.</i>
<i>Brake-shaft brace,</i>	<i>Pedestal-brace.</i>
<i>Brake-shaft-step</i>	<i>Roof-brace.</i>
<i>brace.</i>	<i>Seat-bracket brace.</i>
<i>Compression-beam</i>	<i>Side-lamp brace.</i>
<i>brace.</i>	<i>Stop-brace.</i>

**Brace-pocket.** 39, figs. 89, 93; 40, figs. 132-136; 41, figs. 132, 134, 136, 138. A casting which forms a socket for holding the ends of braces, especially of car-bodies. See *Brace*, also *double-brace pocket*.

**Brace-rod.** 34, figs. 89, 93; 52, figs. 177-8; 10, fig. 2185. An *inclined* iron rod which acts as a brace. A vertical rod acting in conjunction with a brace, is called a *sill-and-plate rod*, or, in passenger-cars, for short rods below the window, *brace straining-rod*. See *Body-brace rod*, *Counterbrace-rod*, *Propelling-lever brace-rod*.

**Brace-rod washer.** 57, figs. 177-8, etc. A bearing-plate for the nut or head of a brace-rod, sometimes made a *triangular* or *beveled* shape, which see, and sometimes a flat bar of iron, bent to fit into a notch cut in the timber, as shown at 38, figs. 89, 93, 132, 136.

**Brace straining-rod** (passenger-car framing). 53, figs. 155-165. A vertical iron rod in the side or end frame of a car-body by which the upper end of a brace is connected or tied to the sill of the car. The brace-rods are members of the truss, of which the sill, braces, posts or plates, etc., form parts. Such rods often have hook-heads at the upper ends against which the braces bear, and nuts at the lower ends by which they are screwed up, and are thus brought into a state of tension and the braces into compression. An equivalent in freight service is the *sill and plate rod*.

**Bracket.** 1. "An angular stay in the form of a knee to support shelves and the like."—*Webster*.

See <i>Arm-rest bracket.</i>	<i>Lamp bracket.</i>
<i>Basket-rack bracket.</i>	<i>Lamp-chimney bracket.</i>
<i>Bell-cord strap-hanger bracket.</i>	<i>Longitudinal-step bracket.</i>
<i>Bell-strap bracket.</i>	<i>Post-bracket.</i>
<i>Berth bracket.</i>	<i>Release-spring bracket.</i>
<i>Berth-corner bracket.</i>	<i>Running-board bracket.</i>
<i>Berth-curtain-rod bracket.</i>	<i>Scheme-rod bracket.</i>

*Brake-lever bracket.*  
*Brake-shaft bracket.*  
*Brake-step bracket.*  
*Coupling-spring bracket.*  
*Cylinder-lever bracket.*  
*Door-track bracket.*  
*Hand-rail bracket.*  
*Inside-hand-rail bracket.*

*Seat-bracket.*  
*Seat-rail bracket.*  
*Side-lamp bracket.*  
*Signal-light bracket.*  
*Sliding-door bracket.*  
*Smoke-bell bracket.*  
*Tender-spring bracket.*  
*Towel-bracket.*  
*Window-curtain bracket.*

2. (Iron framing for bridges or cars.) An L-shaped angle-plate riveted to each of two members which it is desired to connect at right angles to each other, as the *end-sill bracket*, C, figs. 146-150. A stronger form, little used in car construction, is by a triangular *Gusset-plate*, which see.

**Bracket** (of cast-iron wheels). Figs. 2125, 2134, etc. The stiffening ribs cast on the plate.

**Bracket-arms** (for lamp). Fig. 830. *Lamp-arms*, which see, which have a rectangular shoulder in them to carry the shade.

**Bracket berth-hinge** (emigrant sleeping berths). A, figs. 682-5. A berth-hinge with a shoulder to directly support the inner edge of the berth without relying on the hinge-pin.

**Bracket gas-burner.** A gas-burner attached to the side of a car.

**Bracket-lamp.** Figs. 859-71. A *Side-lamp*, which see.

**Bracket-nut** ("American" steam brake-valve). 9, figs. 360-2. A small *Spanner-nut*, which see.

**Bracket studs and nuts** ("American" steam tender-brake). 6, figs. 366-7. The means of attaching the brake-cylinder to a bracket on the tender. See *Stud*.

**Brake, or brake-gear.** Figs. 227-369. The whole combination of parts by which the motion of a car is retarded or arrested. Passenger-car brakes are now almost exclusively *atmospheric*, being either *air-brakes* operating by compressed air, or *vacuum* brakes operating by creating a vacuum. Of the latter are the *Eames* and *Smith* vacuum brakes. Of the former the most important by far is the *Westinghouse*, although the *Loughridge* is also used. The *Westinghouse* is now almost exclusively used in its *automatic* form, and by the term *Westinghouse brake* the *Westinghouse automatic brake* is now always referred to. The *Creamer* spring brake, figs. 263-5, designed for use in emergencies only, is now out of use.



Of freight brakes, *continuous* or *train* brakes are as yet little used. The *compression brake*, figs. 368-9, has been partially introduced, and the Westinghouse automatic has been and is now being applied quite extensively to freight service in a slightly modified form. Of the methods of combining brake-levers to apply any form of brake power are (figs. 227-35) the *Elder*, *Hodge*, *single-lever*, *double-lever*, *Stevens*, *Tanner* and *Tyler*. A special form is also used for drop-bottom cars. These levers move the *brake-beams* which carry the *brake-shoes* bearing against the wheels. The brake-beams are either *inner-hung*, fig. 249, or *outer-hung*, fig. 236. Inner-hung brakes are also termed *compression-rod* brakes, the brake-lever coupling-bar (19, fig. 249) which unites them being in compression. *Driving-wheel* brakes, both steam and air, are in increasing use. See any of the words in italics for further information.

**Brake** (for drop-bottom car). Figs. 105-8, 228. A brake arranged so that none of the rods or levers will interfere with the drop doors.

**Brake-axle** (Kalamazoo lever hand-car). 2, figs. 1724-6. A shaft carrying the *S-brake shoes*, which see.

**Brake-beam**. 1, figs. 227-35, etc., etc.; figs. 146-7. Transverse iron or wooden bars to which the brake-block and shoes are attached. They are either *inner-hung* or *outer-hung*, and often trussed, especially in passenger service. See *Trussed brake-beam*. *Marden brake-beam*.

**Brake-beam chafing-plate**. A plate attached to a *brake-beam* against which a *brake-spring* bears, designed to resist the wear due to the action of the spring.

**Brake-beam eye-bolt**. 85, figs. 1943, 1946, 1961. An eye-bolt for fastening a *lower brake-rod* to a *brake-beam* on trucks having but one brake-lever. They have threads cut nearly their entire length, and usually a nut is placed on each side of the brake-beam, which can be screwed up so as to take up the wear of the brake-shoes.

**Brake-beam fulcrum**. See *Brake-lever fulcrum*.

**Brake-beam hanger** (hand-car). 28, fig. 1720-3. A *Brake-hanger*, which see.

**Brake-beam king-post**. 6, figs. 246, 250. A post or distance-piece, which forms a bearing for the truss-rods of a brake-beam. Sometimes the brake-lever is attached to it and it then forms also a fulcrum for the latter.

**Brake-beam truss-rod**. 5, figs. 246, 250. A rod used to truss or strengthen a brake-beam.

**Brake-block**. Fig. 238. Also 82, figs. 1927-69; 1, figs. 236-51. A piece of wood or metal which carries a removable *shoe* which bears directly against the tread of the wheel when the brake is applied. The brake-blocks are attached to the ends of a *brake-beam*. A *brake-head* is supposed to be a combined brake-block and shoe, but *brake-block* and *brake-head* are often used as equivalent terms.

2. ("American" steam driver-brakes.) 12, figs. 358-9; 26, figs. 363-5.

3. (English.) 63, figs. 116-7. See *Wooden brake-block*, wood being the material of which they are composed.

4. (Westinghouse driving-wheel brake.) 17, figs. 322-3. **Brake-block pin** (Westinghouse driving-wheel brake). 26, fig. 322. A pin by which the *suspending links* are attached to the brake-block.

**Brake-block pin-rod** (Westinghouse driving-wheel brake). 27, figs. 322-3. A tie-rod connecting the brake-shoes on opposite sides of the locomotive, to resist the tendency of the coned wheels to throw the brake-shoes outward. It is hung downward by a link to enable it to pass under the ash-pan.

**Brake-block suspending-link** (Westinghouse driving-wheel brake). 23, figs. 322-3. An iron bar attached to the *suspending-stud* at the top and to the *brake-block pin* at the bottom.

**Brake-block suspending-plates** (Westinghouse driving-wheel brake). 24, figs. 322-323. Wrought-iron plates bolted to the locomotive frame and carrying the *stud* furnishing a support to the upper end of the *brake-block suspending-link*.

**Brake-block suspending-stud** (Westinghouse driving-wheel brake). 25, figs. 322, 323. See above.

**Brake-block tie-rod** (Westinghouse driving-wheel, brake). 27, figs. 322-3. See *Brake-block pin-rod*.

**Brake-carrier**. See *Brake-hanger carrier*.

**Brake-chain**. See *Brake-shaft chain*.

**Brake-chain worm**. 160, figs. 155, 157; 1, fig. 686. A conical casting attached to the brake-shaft with a screw-shaped groove for the brake-chain. Its object is to produce a rapid motion at first and increase the power when the brake-shoes are brought to a bearing.

**Brake-clevis**. A *brake-lever fulcrum*, which see.

**Brake-connecting-rod**. Fig 1784. More properly, *brake-chain connecting rod*.

**Brake-cord guide.** Figs. 730-1. A guide similar to a bell-cord guide for the air-brake cord which passes through every car fitted with the Westinghouse automatic brake, and operates the *conductor's valve*, fig. 293.

**Brake-cylinder** (Westinghouse automatic brake). Figs. 292-369. A cast iron cylinder attached to the under side of the car-frame, fitted with two *heads* and a *piston*, against which the compressed air exerts its pressure to apply the brakes. The piston-rod was formerly attached to a *release-lever* to which a *release-spring*, exterior to the cylinder, was attached. In the gear at present in use the release-spring is coiled within the brake-cylinder, figs. 329-31, and pushes against the *cylinder-lever*, 7, fig. 325, or in the freight gear against the *floating-lever*, 4, fig. 339, through a *push-bar*, which see. In the freight gear the brake-cylinder, triple-valve and auxiliary reservoir are all combined in one part, figs. 352, etc. In the Eames vacuum brake a *diaphragm* takes the place of the brake-cylinder. In the Smith vacuum it is an accordion-like cylinder with stiffening interior ribs to prevent collapse under air-pressure.

2. (Westinghouse tender-brake.) 2, figs. 297-9, 307, 330. A cylinder similar to the above, except that the piston is provided with a long *piston-sleeve*, 6, to guide the *push-bar*, which see.

3. (Westinghouse driving-wheel brake.) Figs. 308, 314-5; 2, figs. 322-3. A cylinder attached to a locomotive in a vertical position between the driving-wheels. The force of the compressed air is transmitted to two *eccentric-levers*, which act against the *brake-heads* and thus apply the brakes. The main casting, 2, of the cylinder is called the *cylinder-body*.

**Brake-cylinder block** (Westinghouse freight brake-gear). 7, figs. 338-9. A stick for attaching the combined cylinder and auxiliary reservoir to the under side of the sills. See *Auxiliary-reservoir beam*, a similar part for passenger cars.

**Brake-cylinder end-block** (Westinghouse freight brake-gear). 8, figs. 338-9.

**Brake-cylinder pipe** (Westinghouse brake). 21, fig. 325. The pipe which connects the brake-cylinder with the triple-valve.

**Brake-cylinder plate** (Westinghouse freight brake). Figs. 338-42. The plate to which the brake-cylinder is bolted and by which it is attached to the sills.

**Brake-dog.** A *brake-pawl*, which see.

**Brake-drum.** A *brake-shaft drum*, which see.

**Brake-equalizer block**, or *centre brake-lever block* (Elder brake). 207, figs. 97-8. A block directly under the centre of the car to which the brake equalizing-lever or centre brake-lever is attached.

**Brake equalizing-lever** (Elder brake). 209, figs. 97-101; 10, fig. 234. More properly, *Centre brake-lever*, which see.

**Brake-equalizer strap.** 208, figs. 97-8. A strap directly under the centre of the car serving as a fulcrum for the *centre brake-lever*.

**Brake-finger.** A *brake-pawl*, which see.

**Brake foot-board.** A *brake-step*, which see.

**Brake hand-rail.** 190, figs. 93-6, 252-4, 656-7. A hand-rail, on the roof of box and stock cars, usually made of gas-pipe, for the protection of brakemen when applying brakes. It is stiffened by a *hand-rail brace*.

**Brake-hanger.** 144, fig. 105; 86, figs. 1907-69; 7, figs. 236-49. A link or bar by which brake-beams and attachments are suspended from a truck-frame or car-body. It is attached to truck and car-body by a *brake-hanger carrier*. A *parallel brake-hanger*, which see, is used in passenger gear only, to cause the brake-beam to move out evenly parallel with itself. In the plan for freight-gear proposed by Mr. Westinghouse, figs. 249-51, the brake-hanger is rigidly attached to the brake-beam, being designed to have sufficient spring to enable the brakes to be put on or off.

2. (English.) 61, figs. 116. A wrought-iron bar by which the brake-block is suspended. No brake-beam is used.

**Brake-hanger bracket** (English). 62, figs. 116-117. American equivalent, *brake-hanger bearing*. A bearing for the brake-hanger, generally made of wrought iron.

**Brake-hanger bearing.** 14, figs. 245, 251, 236, 249. A casting which is held by a brake-hanger carrier, and which forms a bearing for a brake-hanger.

**Brake-hanger carrier.** 87, fig. 1969; 8, figs. 245, 251, 236, 249. An eye or U-bolt, a casting or other fastening by which a brake-hanger is attached to the truck or body of a car. See also *Parallel brake-hanger carrier*.

**Brake-hanger timber.** 6, figs. 88, 94, 91, 96, 106. A short transverse timber between the floor-timbers of a car-



body, and which is framed into them, and to which the brake-hangers, which are hung from the body of a car, are attached.

**Brake-head.** Figs. 1977-81; also 142, fig. 105; 83, figs. 237, 1945. A piece of iron or wood attached to a brake-beam and which hears against the wheels, and combines both a brake-block and brake-shoe in one piece. The term is also commonly applied to *brake-blocks* which carry a detachable shoe. See *Christie. Standard, Banning, etc.*

**Brake-hose** (Westinghouse car-brake). Figs. 293, 311; 26, figs. 324, 325. Flexible tubes made of India-rubber and canvas by which the cars are connected together and compressed air which operates the brakes conducted through the train. The hose is made with a *coupling* at each end of each car, so that they can readily be connected or disconnected. See *Armored brake-hose*.

2. (Eames vacuum brake.) Figs. 280-1. A coiled wire is used inside to prevent collapsing.

**Brake-hose armor.** See *Armored brake-hose*.

**Brake-hose coupling** (Westinghouse brake). Figs. 327-8. A contrivance for coupling or connecting the ends of a pair of brake-hose together, so that the air by which the brakes are operated can pass from one vehicle in a train to another. The couplings for train-signal apparatus are made with thicker lips than brake-hose couplings, though otherwise similar, to avoid danger of wrong connections.

2. (Eames vacuum brake.) Figs. 280-1. Accomplishes the same result as the Westinghouse coupling, in a somewhat different manner.

**Brake-hose coupling-cap** (Westinghouse brake). 2, figs. 327-8. A screw plug in a coupling-case which holds the coupling-valve in place.

**Brake-hose coupling-case** (Westinghouse brake). 1, figs. 327-8. A hollow casting which joins the main part of a coupling to which the hose is attached.

**Brake-hose coupling packing-expander** (Westinghouse brake). Figs. 327-8. A metal bushing or cage, formerly used to expand the packing when the valves are removed, in place of the valves in the ordinary brake. The present substitute is a plain ring with a bar across it for opening the valves, in couplings having valves.

**Brake-hose coupling-valve** (Westinghouse brake). 5, figs. 327-8. A puppet-valve to prevent the escape of air from the hose when uncoupled.

**Brake-hose coupling-valve spring** (Westinghouse brake). 6, figs. 327-8.

**Brake-hose nipple** (Westinghouse brake). Figs. 51-54. A tubular elbow connecting the coupling-hose and the brake-pipe.

**Brake-lever.** 92, figs. 1907-69; 11, figs. 236-51; 11, fig. 325, etc. A lever by which the power employed to apply the brakes is transmitted to the *brake-beams*. The brake-levers are connected to the brake-beams at or near the short ends of the former, and the *brake-shaft connecting-rod*, or some equivalent part, to the other end.

When only one brake-lever to a truck is used, as in figs. 1961, etc., the pressure of the two brake-beams is unequal. To obviate this two brake-levers are usually used, as 11, figs. 236-49, which are further distinguished as *dead-lever* and *live-lever*, figs. 338-348. The upper end of the *dead-levers* is then attached to a *brake-lever stop* or *dead-lever guide*. *Dead-levers* are also called *fixed brake-levers*. See *Centre brake-lever. Floating lever*.

2. (English.) 57, figs. 116-119. A long bar attached to the *brake-shaft* in order to apply the brake to by hand. See *Guard's van*.

**Brake-lever bracket** (hopper-bottom coal cars). 148, figs. 105-6. A wrought-iron knee on the under side of a car, to which the fulcrum of a brake-lever is attached.

**Brake-lever-bracket brace.** 149, fig. 105. A diagonal wrought-iron brace, to stiffen the brake-lever-bracket.

**Brake-lever clevis.** A *Brake-lever fulcrum*, which see.

**Brake-lever coupling-bar** (inner-hung brakes). 19, figs. 249-51. A compression-bar connecting the two brake-levers (*dead-lever* and *live-lever*), to which it is fastened by the *coupling-bar pin*. When the brakes are outer-hung, this member becomes in tension instead of compression and is known as the *lower brake-rod*.

**Brake-lever fulcrum.** 146, figs. 105-8; 93, figs. 1907-69; 12, figs. 245, 251. A forked iron attached to a *brake-beam* by means of which a *brake-lever* is connected to the beam. It is usually a *jaw-bolt*, fig. 1796. In some cases a casting is used, as fig. 1747, *brake-lever jaw*.

**Brake-lever guard** (English). 58, figs. 116-118. No American equivalent. A curved wrought-iron bar which confines the movement of the brake-lever within proper limits. See also *Brake-lever ratchet*.

**Brake-lever guide.** 147, figs. 105-7; 94, figs. 1928-9, 1964-5; 2, figs. 238-9. An iron bar which guides the

- upper end of a brake-lever. Further distinguished as *live-lever* and *dead-lever* guides, the latter provided with pins for readjustment as the brake-shoes wear, and also called a *brake-lever stop*.
- Brake-lever handle** (English). 60, figs. 116-119. The handle at the end of the brake-lever.
- Brake-lever jaw**. Fig. 1747. A *Brake-lever fulcrum*, which see.
- Brake-lever pintle** (lever hand-car). 27, figs. 1724-6. See *Pintle*.
- Brake-lever ratchet** (English). 59, 116-119. Teeth cut in the *brake-lever guard* (which see), to prevent the brake coming off after being applied.
- Brake-lever sheave** (Elder brake-gear). Fig. 234; 96, figs. 1929, 1931. A pulley attached to a brake-lever, over which a chain by which the brakes are applied runs.
- Brake-lever stop**. 95, figs. 1945-64; 13, figs. 236, 249. An iron bar or loop attached to a truck or car frame, and which holds the upper end of a fixed or *dead* brake-lever. It usually has holes in it in which a fulcrum pin is inserted. By moving the pin from one hole to another the lever is adjusted so as to take up the wear of the brake-shoes. Also called *Dead-lever guide*.
- Brake-mast**. Fig. 1801. A *Brake-shaft*, which see.
- Brake-pawl**. 159, figs. 156, 170, 182, 241, 252-62. A small pivoted bar for engaging in the teeth of a *brake ratchet-wheel*, which see. It is placed in such a position as to be worked by the foot. The mode of attachment now considered the best is shown in figs. 252-62.
- Brake-pawl carrier**. 6, figs. 252-4, 264. See *Brake-pawl* and *Brake ratchet-wheel*.
- Brake-pawl dog**. 5, figs. 252-4, 259. A pivoted casting serving as a weight to throw up the *brake-pawl* so as to engage with the ratchet on the under side of the *brake ratchet-wheel*, which see, in the improved brake-gear shown in figs. 252-4.
- Brake-pipe** (Westinghouse automatic-brake). 16, figs. 325; 9, figs. 338-9; L, fig. 687. An iron pipe extending from one end of the car to the other under the car-body, and connected to the pipes on the adjoining cars by flexible *brake-hose*, serving to convey the air from the air-pump on the engine to the *auxiliary reservoirs* attached to the cars. These pipes are filled with compressed air when the brakes are not on. When the latter are to be applied, the air is allowed to escape from

the pipes, which causes the *triple-valves* to open communication between the *auxiliary reservoirs* and the *brake-cylinders*, so that the compressed air stored up in the reservoirs acts on the pistons and brake-levers.

- Brake ratchet-wheel**. 103, figs. 82-92; figs. 241, 258; 158, figs. 169-83, etc. A wheel attached to a brake-shaft having teeth shaped like a saw, into which a *pawl* engages, thus preventing the wheel and shaft from turning backward. An improved form of recent introduction. 7, figs. 252-4, is a ratchet-wheel with the ratchet upon the under side, instead of on the edge. The brake-pawl falls away of itself by gravity from the ratchet-wheel, except when the *brake-pawl dog*, 5, is thrown over so as to bear upon its outer end. In that case the brake-pawl is automatic in its action, without being adjusted by the foot of the brakeman. The brake-pawl is pivoted in the *brake-pawl carrier*, which latter is bolted to the roof of the car.

At the Thirteenth Annual M. C. B. Convention it was recommended that the practice of placing the ratchet-gear on a small platform or *brake-step* (100, figs. 82, 84, 89, etc.) be discontinued, and that they be fastened to a suitable casting on the roof.

[In most of the standard English dictionaries, as well as in Knight's "American Mechanical Dictionary," the term ratchet is defined as the dog or pawl which catches into the ratchet-wheel, as well as the ratchet-wheel itself. The same dictionaries, however, also give *pawl* as the name for the part serving this purpose, and it is believed that this is an error in definition, at least as respects American practice, which has been copied from one dictionary to another, and which does not correspond with the practice in mechanical work, in which the term "ratchet" is confined to the serrated edge, whether straight or on a wheel, into which the pawl engages, and does not designate the pawl itself as a ratchet.]

- Brake ratchet gear, complete**. Figs. 241, 252-62.
- Brake-rod**. Any rod serving to connect brake-levers, but especially the *lower brake-rod*, 97, figs. 1907-69, which see, and the *secondary brake-rod*, 6, figs. 227-35, which see. The *brake-shaft connecting-rod* is sometimes called the *main brake-rod*. The *long brake-rod*, 12, fig. 232, extends the entire length of the car in the Stevens brake-gear.
- See *Lower brake-rod*. *Secondary brake-rod*.  
*Main brake-rod*.
2. (English.) 56, figs. 116-119. A bar of iron connecting the *brake-shaft arms* to the brake-blocks.
- Brake-rod guide**. Any form of special support for a brake-rod.



**Brake-rubber.** A *Brake-shoe*, which see.

**Brake safety-chain, or link.** 88, figs. 1947, 1928, 1931, 1948; 9, figs. 236, 245, 249. A chain attached by *brake safety-chain eye-bolts* to a brake-beam and to the truck or body of a car. It is intended for the same purpose as a *brake safety-strap*, which see, to hold the brake-beams in case a brake-hanger should break. Sometimes made of a single link or bar.

**Brake safety-chain eye-bolt.** 89, figs. 1931, 1948; 10, figs. 236, 245, 249. An eye-bolt attached to a truck or car-body, and which holds a brake safety-chain.

**Brake safety-strap.** 90, figs. 1942-44, 1955-69. A strap of iron fastened to the end-piece or transom of a truck and bent into such a shape as to embrace the brake-beam. In case any of the hangers should give way, the safety-strap is intended to catch and hold the beam and prevent it from falling on the track. Sometimes it is made of steel, and used as a brake-spring for throwing off the brake. A *Brake safety-chain*, which see, is another device for the same purpose.

**Brake-shaft.** 94, figs. 82-142; 152, figs. 155-185. A vertical shaft on which a chain is wound and by which the power of a hand-brake is applied to the wheels. It is sometimes made *horizontal* and so called, as figs. 82, 132, etc. In box and stock cars it extends above the roof and is called a *long brake-shaft*.

The M. C. B. Association (1879) recommended, "that all brake-shafts be placed on the left-hand corner of the car when a person is standing on the track facing the end of the car, as in fig. 657. See *Horizontal brake-shaft*. *Long brake-shaft*.

2. (English.) 53, figs. 116-119. A horizontal shaft to which are attached *brake-shaft arms* which actuate the brake-blocks. A long lever is attached to it, provided with a handle by which the brakes can be applied.

**Brake-shaft arm** (English). 55, figs. 116-119. See above.

**Brake-shaft bearing.** A metal eye by which a brake-shaft is held in its place, and in which it turns. See *Brake-shaft step*. *Lower brake-shaft bearing*. *Upper brake-shaft bearing*.

**Brake-shaft brace** (Miller coupler and platform). 1, figs. 636, 640. A brace which holds the bottom of the brake-shaft and forms a step for it.

**Brake-shaft bracket.** 99 figs. 82, 84, 132, 136. A support for holding a horizontal brake-shaft in its place.

2. (Creamer brake, which see.) 18, fig. 263.

**Brake-shaft bushing** (Miller coupler and platform). Figs. 636-43. A thimble on the brake-shaft.

**Brake-shaft chain.** 150, fig. 105; 3, figs. 227-35. A chain connecting the *brake-shaft* with the *brake-levers* through the *brake-shaft connecting-rods*, to the end of which it is attached. The force exerted on the shaft is transmitted by this chain. With the usual dimensions of shaft and chain, as now adopted, the tension obtained upon the brake-shaft chain is about 100 lbs. per inch in diameter of brake-wheel. See *Horizontal brake-shaft chain*.

**Brake-shaft-chain sheave** (Elder brake-gear). Fig. 234; 105, figs. 82, 84, 132, 136. A roller over which a brake-shaft chain passes.

**Brake-shaft connecting-rod.** 151, figs. 105, 108; 4, figs. 227-35; 9, fig. 325. A rod which is attached at one end to a *brake-chain*, and at the other to a *brake-lever*, or to the *centre-lever* of the Tanner or Elder brake, or to the *floating-lever* of the Hodge brake.

**Brake-shaft crank** (street cars). 120, figs. 1843, 1845. An elbow attached to the upper end of the brake-shaft, carrying a handle for turning the brake-shaft and operating the brakes.

**Brake-shaft crank-handle** (street cars). 121, figs. 1843, 1845. See above.

**Brake-shaft cross-bearer** (English). 7, figs. 117, 119. A piece of timber secured to the *under frame* and carrying a wrought-iron bracket in which the *brake-shaft* works.

**Brak-shaft drum.** The part of a brake-shaft on which the brake-chain is wound. See *Brake-chain worm*.

**Brake-shaft hanger** (English). 54, figs. 116-119. A bracket by which the *brake-shaft* is carried and in which it is free to revolve.

**Brake-shaft holder.** A *Brake-shaft bearing*, which see.

**Brake-shaft stand** (Janney). 114, figs. 542-54. A *Brake-shaft step*, which see.

**Brake-shaft step.** 100, figs. 83 to 134; 98, figs. 87-143; 153, figs. 155-83. A bearing which holds the lower end of a brake-shaft. It usually consists of a U-shaped bar of iron, the upper ends of which are fastened to the car-body, with a hole in the curved part of the bar which receives the end of the shaft. The *brake-shaft step* should not be confounded with a *brake-step*, which latter is a shelf on which the brakeman may step when applying brakes.

**Brake-shaft-step brace.** A wrought-iron brace to resist the pull of the brake-chain.

**Brake-shaft thimble.** 44, fig. 640. An iron bushing attached to some portion of the car to form a bearing for a brake-shaft.

**Brake-shoe.** Figs. 1977-81; 2, figs. 236-46; fig. 238. A piece of metal or wood shaped to fit the tread of a car-wheel and attached by a key or otherwise to a *brake-block* or *brake-head*. The latter term, however, is more properly a combined brake-shoe and brake-block in one solid casting. The brake-shoe rubs against the tread of the wheel when the brakes are applied. Such shoes are made of cast, wrought, or malleable iron, usually cast iron. The *Congdon brake-shoe*, fig. 239, is of cast iron, with loose scraps of wrought iron or steel cast in it, greatly increasing its durability and, it is claimed, improving or not injuring its holding power. English brake-shoes (*brake-blocks*), 63, fig. 116, are of wood.

See *Standard brake-shoe*. *Christie brake-shoe*.  
*Fowler brake-shoe*. *Reversible-hook brake-shoe*.  
*Banning brake-shoe*. *Ross brake-shoe*.

2. ("American" steam driver-brake.) 27, figs. 363-5.

3. (Westinghouse driving-wheel brake.) 16, fig. 322.

**Brake-shoe hanger** ("American" bell-crank steam driver-brake). 15, figs. 363-5. In the Westinghouse brake called the *suspending-link*.

**Brake-shoe key.** Fig. 233. A key or wedge by which a *brake-shoe* is fastened to a *brake-block*.

**Brake-spool.** Fig. 1748. Also called *brake-shaft drum*. An enlargement by a sleeve or otherwise of a brake-shaft to give greater speed and less power to the brake-gear. A *Brake-chain worm*, which see, is a somewhat similar device.

**Brake-spool step** (logging cars). Fig. 1800. A U-shaped strap inclosing the brake-spool and equivalent to a *Brake-step*, which see.

**Brake-spring.** A *Release-spring*, which see.

**Brake-staff.** A *Brake-shaft*, which see.

**Brake-step.** 100, figs. 82-92, 132-4. A small shelf or ledge on the end of a freight-car near the top, on which the brakeman stands when applying the brake from the top of a car. Also called a *brake foot-board*. A *brake-step* should not be confounded with a *brake-shaft step*, which see, which is a bearing for the lower end of a *brake-shaft*.

The use of brake-steps has been condemned by the Master Car-Builders' Association, which recommended (Chicago, 1879), "That the small platform (*brake-step*) placed at one end of freight cars, to fasten the brake-pawl, etc., be discontinued, the ratchet-wheel and pawl to be fastened to a suitable casting on the roof." See fig. 657.

**Brake-step bracket.** 101, figs. 82-92, 132-4. An iron bracket to support a brake-step.

**Brake-treadle** (hand-cars). 4, fig. 1724-6. A lever for applying brakes with the foot.

**Brake-valve** (of air or steam brakes). The valve operated by the engineman to apply brakes. See *Engineer's brake-valve* (Westinghouse), figs. 311, 334. *Steam brake-valve* (American), figs. 360-2.

**Brake van** (English). American equivalent, *caboose* or *baggage car*. A covered vehicle in which the conductor (guard) of a train travels, and which is fitted with a powerful screw hand-brake. On passenger trains it carries the passengers' baggage (luggage), express matter (parcels), and dogs, etc. On freight (goods) trains it is weighted with pig-iron, and is primarily used as a source of brake power. Also called *guard's van*.

**Brake-windlass.** A term sometimes used to designate the *brake-shaft*, which see, with all its attached parts.

**Brake-wheel.** 93, figs. 82-143; 157, figs. 155-83; fig. 257, etc. A hand-wheel attached to brake-shaft, and by which the latter is turned. Sometimes on coal cars and elsewhere a mere bent rod is used, as in fig. 109.

**Brass.** "An alloy of copper and zinc. The term is commonly applied to the yellow alloy of copper with about half its weight of zinc, in which case it is called by engineers *yellow-brass*; but copper alloyed with about one-ninth its weight of tin is the metal of brass ordnance or gun-metal. Similar alloys used for the 'brasses' or bearings of machinery are called *hard brass*, and when employed for statues and medals they are called *bronze*." —Toml. *Cycl. Useful Arts*.

According to present usage, alloys of copper and tin, or of copper, tin and zinc, are termed *bronzes*, which see. Railroad *journal-bearings*, which see, are often termed *brasses*, but are generally bronzes.

**Bridge.** In car construction the term *bridge* means a timber, bar or beam which is supported at each end. See *Bolster-bridge*. *Centre-bearing bridge*. *Side-bearing bridge*.



**Bridge's coupling-link.** Fig. 439. See *Coupling-link*. A device patented by John Bridge, of Detroit, Mich., July 11, 1882, designed to give greater wearing surface at the ends where the coupling-pin bears against it.

**Brilliant" Argand-burner.** Fig. 875. See *Argand-burner*.

**Broad-band elliptic-spring.** Figs. 1209, 1224. See *Seat-spring*.

**Broad-gauge.** The distance between the heads of the rails when greater than 4 ft. 8½ in. The principal broad gauge in use is the 5 ft. gauge, which is still almost universal in the Southern United States, but is gradually being changed to the standard. The 6 ft. gauge formerly in use on the Erie Railway and its connections has entirely passed out of use, except on a few miles of branches, as has also the 7 ft. gauge formerly used on the Great Western Railway of England. In Canada the 5 ft. 6 in. gauge was formerly the standard, but is now rapidly being changed to 4 ft. 8½ in. The standard gauge of the Pennsylvania and its allied lines is 4 ft. 9 in. and in Ohio 4 ft. 10 in. was formerly common, but it has now been abandoned; 5 ft. 6 in. is the standard gauge of the Irish and East Indian railways. See *Narrow-gauge*, *Standard-gauge*.

**Broad-lace (English).** 206, fig. 204. A woolen fabric made in bands about 4 in. wide and used as an ornamental border to the upholstery of a carriage.

**Broad-tread wheel.** A wheel of which the tread is wider than usual, so as to be able to run over 4 ft. 8½ in., 4 ft. 9 in. and 4 ft. 10 in. gauges. Also called *compromise-wheels*. They are now rarely if ever used, the usual width of tread having somewhat increased and the mileage of track of over 4 ft. 9 in. gauge greatly decreased.

**Brooks' car-door fastener.** Figs. 1108-9. See *Car-door fastener*.

**Bronze.** An alloy composed of copper and tin, sometimes with a little zinc and lead. Bronzes also often contain various other metals and chemical substances, as *Phosphor-bronze*, which see. *Brass* is an alloy of copper and zinc. Most journal-bearings are bronzes. The variety of proportions of the various metals is very great.

**Brush.** Fig. 1879. See *Car-window brush*.

**Brush-and-comb rack.** Fig. 1581-3.

**Buckle (English).** 23, figs. 116-9, 204-7. See *Bearing-spring buckle*.

**Buffer.** An elastic apparatus or cushion attached to the end of a car to receive the concussions of other cars running against it. The term is generally applied to those attachments in which springs are used to give the apparatus elasticity. The term is often applied to a *Drawbar*, which see.

2. (Cowell platform and coupler.) 1, fig. 538. The *Platform-plate*, which see.

3. (Janney coupler.) 4 and 5, figs. 542-54; 29', fig. 188. The bars projecting beyond the platform in passenger cars and beyond the end-sills in freight cars, to transmit the shock of coupling to springs with which they connect. They are two in number in the Janney coupler, but only one, directly above the drawbar hook, in the Miller. The Janney buffer is made in two styles, round-face and (more recently) flat-face.

4. (Miller coupler.) 35, figs. 636-40. See above.

**Buffer-arm.** A *Drawbar timber*, which see.

**Buffer-bar.** A wrought-iron bar at the end of a car, carrying a *Buffer*, which see. In this country they are used chiefly with the Miller and Janney platforms.

**Buffer-beam.** 1. (Freight cars.) 32', fig. 106. A transverse timber bolted to the outside of an end-sill of a car to which the *dead-blocks* are attached. It is only occasionally used. See also *Spring end-sill*, which is sometimes called a buffer-beam.

2. (Passenger cars.) 38, figs. 155-177; 103, fig. 1843. A term also used to designate a *platform end-timber*.

**Buffer-block.** Figs. 406, etc. A single wooden block or stick of timber attached to the end-sill of freight cars or platform end-timbers of passenger cars to protect persons between the cars from injury, by preventing the cars from coming together in case the drawbar or its attachments should give way.

The terms *buffer-block* and *dead-block* are often confused in meaning. A *buffer-block* is a single piece of timber bolted to the end-sill of a car above the drawbar, as shown in fig. 406, while *dead-blocks* are used in pairs, one on each side of the drawbar, as shown at 1, 1, fig. 405. But these attachments are also, by increasing usage, distinguished simply as *single* and *double dead-blocks*, as in the formal action of the M. C. B. Association, figs. 405-8.

2. (English.) A piece of hard-wood packing, interposed between the *Buffer-rod guide* and the *head-stock*. This term is also improperly used to describe the *Buffer-rod guide*, which see.

**Buffer-block face-plate.** A metal plate bolted to the face of a wooden buffer-block to protect the wood from wear.

**Buffer-cushion** (Cowell coupler). 23, fig. 538. A semi-circular rubber pad, placed inside the supplemental platform and coming between it and the platform end-timber of the next car, to prevent the platform or buffer-springs from being overloaded.

**Buffer-guide** (Janney coupler.) 30, figs. 542-554, 555-601. The malleable iron sleeve carrying the Janney buffer-shank through the platform end-timber.

2. (Janney-Miller coupler). 29, figs. 542-554, 555-601. The malleable iron sleeve carrying the Miller buffer-shank through the platform end-timber.

**Buffer-head.** 35, figs. 636-41, etc. A broad, flat end of a buffer in Miller, Janney, or English draw-gear. In English cars they are about 12 in. in diameter, in American much less. See *Buffer*.

2. (English.) 47, figs. 116-117 and 205-206. See above. Equivalent, *side buffer*.

**Buffer-plate** (Miller platform). 3, figs. 638, 640. An iron plate with which the buffer-beam is faced, and through which the buffer-shank passes.

**Buffer-rod** (English). 48, figs. 116-119 and 204-207. A rod which transmits buffing strains from the *buffer-head* to the *buffer-spring*.

**Buffer-rod guide, or buffer-block** (English). 49, figs. 116, 117, 118 and 205-207. A casting bolted to the outer side of the *end-sill* or *head-stock*.

**Buffer-rod shoe** (English). 50, figs. 117 and 206. A casting keyed to the end of the *buffer-rod* which bears on the *buffing-spring*.

**Buffer safety-lug.** 21, figs. 383, etc. A projecting horn sometimes cast on top of freight drawbars to bear against a buffer-block and relieve the draw-gear from excessive compressive strains. It is not in general use.

**Buffer-shank** (Miller buffer). 36, fig. 639. The square part between the buffer-head and buffer-stem.

**Buffer-spring** (Cowell coupler). 14, fig. 538. Two springs bearing against the rock-lever, serving the purpose which their name implies, and assisted in cases of severe impact by the rubber buffer-cushion 23.

2. (Freight cars.) Figs. 2053-5. A synonymous term for *draw-spring*, there not being usually separate springs for buffing and draft strains. *Draw-spring* is the preferred term, although both are much used.

3. (Hoit draw-gear.) 4, figs. 426-7. A spring sustaining buffing strains only, and abutting against a cross-piece termed the *follower-plate block*, which latter is stiffened against buffing strains by the *double-spring draw-bar timbers*.

4. (Janney coupler.) 26, figs. 542-554, 555-601. More properly *centre buffer-spring*, against which the *equalizer* bears connecting the two buffers.

5. (Miller coupler.) 5, figs. 636-8.

**Buffer-spring bed** (English). 8, figs. 116, 117 and 205, 206. Serves the purpose of the American *draw-timber*. A timber in the centre of the under frame which receives the thrust of the buffing-spring.

**Buffer-spring beam** (Miller coupler). 24, figs. 636-8. A short transverse timber framed between the draw-timbers, against which the buffer-spring bears.

**Buffer-spring cup** (Miller coupler). 6, figs. 636-8. An iron seat in which the inside end of the buffer-spring rests, when a volute spring; when a spiral spring, the spring-cup is the same as the *buffer-spring washer*.

**Buffer-spring washer** (Miller coupler). 7, figs. 636-8. See *Buffer-spring cup*.

**Buffer-stem** (Miller buffer-bar). 37, fig. 639. The round part which passes through the buffer-springs.

**Buffer-stem washer** (Miller coupler). 8, figs. 637-8. The bearing for the key in the end of the buffer-bar.

**Buffer-thimble** (Miller coupler). 9, fig. 638. A cast-iron bushing in the platform end-timber. The buffer-thimble and buffer-plate are now made in one piece.

**Buffer-washer** (Janney). 38, figs. 542-554, 555-601. A malleable iron washer with square hole used on inner end of Janney buffer.

**Buffet** (boo-fāy', Fr.). Figs. 213, 679, etc. A side-board. Hence—

**Buffet-car** (boo-fāy'-car). A term (meaning, literally, *side-board-car*) applied to a style of sleeping-car of late introduction, the novelty in which consists in the addition of an ornamental buffet with plate-glass front at one end of the car where light lunches can be prepared for the passengers. *Buffet smoking-cars* are also built in the same general style of finish.

**Buffing and draw spring** (English). See *Plate buffing and draw-spring*.

**Bullion-van** (English). A covered vehicle adapted to run on passenger trains for the conveyance of specially valu-



able property. The body is built of stout iron plates and the doors provided with special locks.

**Bull's-eye.** Figs. 907, 956. A convex glass lens, which is placed in front of a lamp to concentrate the light so as to make it more conspicuous for a signal. They are used to close the opening in fixed lamps at the ends of cars, and also in signal lanterns. See *Semaphore lens*, figs. 954-5, and *Fresnel lens*, figs. 957-8.

**Bull's-eye lamp.** Figs. 907-73. See *Signal-lamp*.

**Bumper.** An indefinite term used to designate a *Buffer* or *Drawbar*, or a *Buffer-block*, which see.

**Bumper-block.** A *Buffer-block*, which see.

**Bunk.** 1. A rough form of sleeping berth permanently built against the side of a car.

2. (Logging cars.) Fig. 1803. A cross-piece similar to a body-bolster on which timber is loaded.

**Bunk-truss** (logging cars). Fig. 1789. An iron strap to stiffen the bunk.

**Buntin's car-seat frame;** also termed *Reversible seats*. Fig. 1139. A mode of combining the seat and seat-back into one piece, the whole seat reversing by swinging the combined seat and seat-back downwards, so that what was the seat becomes the back, and *vice versa*, instead of turning the back only over in the usual manner.

**Burden car.** A term in use on the Baltimore & Ohio Railroad to designate freight cars.

**Burrell's reversible signal-lantern.** Figs. 972-3. A form of lantern in which the lamp is fixed to the handle, and a pair of glass globes of different colors are carried in a frame swinging around the lamp so that by reversing it the color can be changed from red to white or green. Another mode of accomplishing the same purpose is shown in the *inspector's lantern*, fig. 960, where colored slides are used to interpose between the lamp and the fixed globe. The advantage claimed in having the double globe is that the change is more easily and certainly made, and that the lower globe, which is not in use, serves as a base to elevate the blaze when the lamp is placed on the ground.

**Burlap.** A coarse canvas for use in car upholstery, generally manufactured 24 or 40 inches wide.

**Burner.** Figs. 872-95. "That part of a lighting apparatus at which combustion takes place."—*Knight*. See *Lamp-burner*. Special varieties, which see, are

*Argand-burner.*

*Bracket gas-burner.*

*Dual burner.*

*Gas-burner.*

*Hinge burner.*

*Minot heating-burner.*

*Screw burner.*

*Spring burner.*

*Sun burner, etc., etc.*

**Bushing.** "A lining for a hole."—*Knight*. Usually a metal cylindrical ring which forms a bearing for some other object, as a shaft, valve, etc., which is inserted in the hole. Often contracted into *bush*.

See *Bell-cord bushing*, figs. 702-8.

*Berth-curtain-rod bushing.*

*Berth-hinge bushing.*

*Brake-shaft bushing.*

*Deck-sash pivot bushing.*

*Head-board bushing.*

*Lower steam-valve bushing.*

*Pipe bushing.*

*Reversing-valve bushing.*

*Sash-lock bushing.*

*Steam-valve bushing.*

*Upper steam-valve bushing.*

*Window-blind bushing.*

*Window-rod bushing.*

2. (Pipe-fitting, which see.) Fig. 1335, etc. A short tube with a screw cut inside and outside, used to screw into a pipe to reduce its diameter. Generally, a bushing has a hexagonal head by which it is turned, and is sometimes called *reducer*.

**Bushnell seat-cushion.** Fig. 1206. A seat-cushion patented by E. L. Bushnell, of Poughkeepsie, N. Y. See *Seat-cushion*.

**Butt.** A contraction of *Butt-hinge*, which see, and generally used as a substitute for the longer term.

**Butt-hinge.** A hinge for hanging doors, etc., which is fastened with screws to the edge of a door, so that when the latter is closed the hinge is folded up between the door and its frame. A hinge like that represented in fig. 779, the two parts of which are so fastened together that they cannot readily be detached, is called a *fast-joint butt-hinge*. Other forms are *loose-joint butt-hinge*, fig. 780, and *loose-pin butt-hinge*, fig. 782. In the best butt-hinges, as in fig. 789, the wear is taken by a hinge-pin screwing into the knuckle and bearing against a washer. The hinge-pin is often ornamented with an acorn, and those having a washer between the two knuckles, but no acorns, are known as *Blake butts*, which see. Butt-hinges are commonly termed simply *butts*.

**Button.** This term, besides its usual meaning, has been used to designate an *axle-collar*, but the term is now obsolete.

See *Door-button*.

*Tufting-button.*

*Door-case-sash button.*  
*Eccentric window button.*  
*L-window button.*  
*Pull-rod button.*

*Solid-leather button.*  
*V-window button.*  
*Wheel-box button.*  
*Window-button.*

## C

**Cabin** (pile-driver car). Figs. 1821-4. A small house for the engine and hoisting-gear, usually built on the *swing-ing-platform*.

**Cabin-car.** A term sometimes applied to *Cabooses*, which see; more particularly four-wheeled caboose cars.

**Cabin-scantling** (pile-driver car). 30, figs. 1821-4. See *Scantling*.

**Cabin-shutter** (pile-driver car). 13, figs. 1821-4.

**Cabooses-car.** Figs. 44-7. A car attached to the rear of all freight trains for the accommodation of the conductor and train-men, and for carrying the various stores, tools, etc., required on freight trains. Also, but rarely, called *conductor's car* or *train car*. Caboosees are often made with a *lookout* for displaying train signals to the locomotive and following trains, and to give the train-men a view of the train. They are in increasing use, but the majority of caboose cars as yet do not have them. Caboose cars are either *four-wheel* or *eight-wheel*, the latter being by far the most common, but the Pennsylvania Railroad and other lines use four-wheeled cabooses, usually termed *cabin cars*. A trap-door is sometimes placed in the platform, as in fig. 103, to serve the purpose of a water-closet.

**Cage.** 116, figs. 139, 142. See *Tank-valve cage*.

**Camber.** The upward deflection or bend of a beam, girder or truss. Freight cars are usually heavily cambered when new by screwing up the body truss-rods. Passenger cars have little or no camber.

**Candle.** A special kind of large diameter called *car-candles* are used for lighting passenger cars and burned in *Candle-lamps*, which see. Since the introduction of high-proof mineral oils they are now rarely used. The best car-candles are made of paraffine and *hydraulic-pressed*.

**Candle-bottom.** Fig. 903. See *Candle-lamp*.

**Candle-holder.** Fig. 904. See *Candle-lamp*.

**Candle-holder cap.** 21, fig. 904. See *Candle-lamp*.

**Candle-holder cup.** 22, fig. 904. See *Candle-lamp*.

**Candle-lamp.** Figs. 828, 846, 903-4. A lamp for burning candles, sometimes elaborated into a *chandelier* with two or three burners. Candles, however, are now but little used. The candle is placed within a *candle-holder*, fig. 904, carried within a *candle-bottom*, fig. 903. The candle-holder consists of a *candle-holder cup* and *candle-holder cap* connected by the *candle-rods*, fig. 904, and having a light spiral *candle-spring* within. As the candle burns away it is pressed upward by the candle-spring against the cap so as to keep the flame always in one position.

**Candle-rods.** 23, fig. 904. See *Candle-lamp*.

**Candle-spring.** 24, fig. 904. See *Candle-lamp*.

**Calaminated iron.** See *Kalaminated iron*.

**California truck.** See *Allen truck*.

**Callender lamp-burner.** Fig. 901. One of the no-chimney burners.

**Cam** (Yale lock). Figs. 1027-8. The revolving disk, usually of a spirally eccentric or heart-shape, fixed on the outside of the shaft which carries the *tumblers*.

**Cane-seat.** Figs. 1157, 1166, 1211, etc. A seat made of woven strips of cane or rattan. For additional strength it is now often *canvas-lined*, the cane seating then coming in rolls. The cane, or rattan, is woven close and cemented to the canvas.

**Cannon-car.** A car especially constructed for carrying heavy cannon. Also called *gun-car*.

**Canopy.** Figs. 940-1. See *Lamp-canopy*. Also called a *Smoke-bell*, which see. A platform-hood is sometimes called a *canopy*.

**Canopy, or smoke-bell** (Harrison postal-car chandelier). A, figs. 841-2.

**Cant-rail** (English). 98, figs. 204-207. American equivalent, *plate*. A horizontal timber running along the top of the upright pieces in the sides of the body, and supporting the roof and *roof-sticks*. Its upper edge is cut to the bevel of the roof; hence its name.

**Cap-screw wrench** (Westinghouse brake). 49, fig. 311.

**Canvas.** A coarse cloth made of cotton, used for outside covering of street-car roofs and for upholstering seats. *Roofing-canvas* is used for covering street-cars.

**Canvas-lined seating.** Fig. 1218. See *Cane-seat*.

**Cap.** The top or covering of anything.



See *Arm-cap.* *Main cap of triple-valve.*  
*Belt-rail cap.* *Reversing-cylinder cap.*  
*Bolster-spring cap.* *Reversing-valve cap.*  
*Brake-hose coupling-cap.* *Right-chamber cap.*  
*Candle-holder cap.* *Smoke-pipe cap.*  
*Equalizing-bar-spring cap.* *Spiral-spring cap.*  
*Inside-lining cap.* *Spring-cap.*  
*Leakage-valve cap.* *Tank-nozzle cap.*  
*Left-chamber cap.* *Trimming cap.*  
*Lever-frame cap.* *Truss-plank cap.*  
*Lower cap of triple-valve.* *Upper cap of triple-valve.*  
*Window-sill cap.*

**Car.** The term used in the United States to designate a vehicle or carriage for running on a railroad. As the term is usually employed, it denotes any vehicle used for transportation and not belonging to the motive power of a railroad.

The term *Coach*, which see, is synonymous with *passenger car*. In England, passenger cars, or coaches, are called *carriages* (*first, second and third-class*), and freight cars *wagons*, or *trucks*, and *vans*, all of which see.

The prices allowed by the Master Car-Builders' Association for the various forms of freight cars will be seen under *Freight car*, which see. Cars are divided into two general classes, *passenger cars* and *freight cars*. The latter is also further subdivided into freight cars proper and *working or construction cars*, the latter including a great variety of types, but a comparatively small number of each type. *Street-cars* for city use, moved by horses, often also called *horse-cars*, are a separate class, which see. *Hand-cars*, which see, are a light vehicle moved by hand-power. Among passenger cars are the following vehicles, which see:

<i>Baggage car.</i>	<i>Hotel car.</i>
<i>Bay-window parlor car.</i>	<i>Mail car.</i>
<i>Buffet sleeping car.</i>	<i>Mann boudoir car.</i>
<i>Combination baggage car.</i>	<i>Officers' car.</i>
<i>Combination car.</i>	<i>Palace car.</i>
<i>Dining car.</i>	<i>Passenger car, or coach (first-class and second-class).</i>
<i>Drawing-room, or parlor car.</i>	<i>Postal car.</i>
<i>Excursion car.</i>	<i>Round-cornered car.</i>
<i>Express car.</i>	<i>Sleeping car.</i>
	<i>Smoking car.</i>

Among the cars for regular freight service are:

<i>Box car.</i>	<i>Gravel car.</i>
<i>Box stock car.</i>	<i>Gun car.</i>

<i>Caboose car, or cabin car (sometimes called conductor's or train car).</i>	<i>Heater car.</i>
<i>Camion car.</i>	<i>Hopper-bottom car.</i>
<i>Coal car.</i>	<i>Ice car.</i>
<i>Coal dump car.</i>	<i>Iron-hopper coal car.</i>
<i>Double-deck car.</i>	<i>Lumber car.</i>
<i>Drop-bottom car.</i>	<i>Milk car.</i>
<i>Dump car.</i>	<i>Mine car.</i>
<i>Flat car.</i>	<i>Oil, or tank car.</i>
<i>Folding-side gondola car.</i>	<i>Ore car.</i>
<i>Furniture car.</i>	<i>Pay car.</i>
<i>Gondola car.</i>	<i>Refrigerator car.</i>
<i>Grain car.</i>	<i>Stock car.</i>
	<i>Tip car.</i>

Among working cars are:

<i>Block car.</i>	<i>Inspection car.</i>
<i>Boarding car.</i>	<i>Sweeping car.</i>
<i>Derrick car.</i>	<i>Tool car.</i>
<i>Ferry push-car.</i>	<i>Wrecking car.</i>

Freight cars are also generally designated as *four-wheel* or *eight-wheel*, the latter carried on two trucks of four wheels each, and including an immense majority of American rolling-stock. *Iron cars* having the sills, etc., of iron are also constructed, and also *tubular cars*, which use iron gas-pipe for framing.

**Car-axle.** Figs. 1974-5. M. C. B. Standard. Also, 2, figs. 1907-69, etc. A shaft made of wrought-iron or steel to which a pair of car-wheels are attached. In nearly all cases the wheels are both rigidly fastened to the axle, but sometimes one, or both of them, is made so that it can turn independently of the axle. The following are the names of the parts of an axle indicated by numbers in fig. 1974: 1, *Centre of axle*; 2, *Neck of axle*; 3, *Wheel-seat*; 4, *Dust-guard bearing*; 5, *Collar*; 6, *Journal*. See *Axle*. *Hammered car-axle*.

**Car-bodies.** Figs. 82-214.

**Car-body details.** Figs. 215-695.

**Car-box.** Figs. 1997-2020, etc. A *Journal-box*, which see.

**Car-box jack-screw.** Fig. 1886. A low jack-screw to fit under a journal-box so as to take the load off the journal-bearing and enable it to be removed.

**Car-candle.** See *Candle*.

**Car-coupler.** An appliance for connecting or coupling cars together. The term is used generally to designate an apparatus which acts automatically. Among passenger couplers, which now are nearly all automatic, are the

*Cowell, Janney, Miller and Blackstone couplers*, which see, figs. 537-643. *Automatic freight-car couplers*, which see, figs. 409-23, are not yet in general use. The M. C. B. Association has taken action in respect to them, favoring those of the same general type as the passenger car couplers.

**Car-cylinder** (Westinghouse brake). Figs. 303-9, 329-31. One of the three kinds of *brake-cylinders*. Each kind is made of several different patterns or sizes.

**Car-door hangers**. Figs. 371-2, 791-801. A device for hanging a sliding door so that it may be movable. In common practice the simple hooks upon which most freight-car doors are hung are termed simply *Door-hangers*, which see, while more elaborate forms with rollers have their name expanded into *car-door hangers*.

Car-door hangers termed anti-friction are of three types, in one of which, figs. 794-4, there are a series of loose rollers passing in rotation over the bearing surface; in the second, figs. 791, 793, 796, the door carries a slotted plate, which rests upon the pivot of a large wheel which rolls upon the track; the third class, figs. 798-801, are of the "grindstone-bearing" type, the journal of the bearing-wheel proper resting upon other wheels.

**Car-door lock**. Figs. 987, 1005-21. A lock for a car-door, usually meaning for a passenger-car door. See *Freight-car lock*.

**Card-rack**. Figs. 1048-9; 80, fig. 93. A small receptacle on the outside of a freight-car to receive cards giving shipping directions.

**Car drain-cup** (Westinghouse automatic brake). Fig. 293; 27, fig. 311. An attachment to the brake-pipe of every car to collect the water of condensation, which is drawn off from time to time by a cock at the bottom.

**Car-furnishings**. Figs. 696-1707. The hardware, upholstery materials and other fittings, such as lamps, ventilators, water-coolers, etc., used in finishing a passenger-car. Stoves and heaters would hardly be called furnishings in general practice, but are so classified for convenience.

**Car-heater**. Figs. 1300-1537. Any apparatus for heating cars by convection, that is, by conveying hot water, steam, or warmed air into, or through, the car. It generally refers to any arrangement for warming cars, other than stoves. See *Baker, Bissell, Gouge, Johnson, Searle,*

*Spear, suspended and Winslow heaters*. See also *Stove, Cook-stove, Range*, etc.

**Carline, or carling**. 81, figs. 84-138; 100, figs. 158-178; 53, figs. 1843-4. A transverse bar of wood or iron which extends across the top of a car or from one side to the other, and which supports the roof-boards. In passenger cars carlines are divided into *main carlines*, passing entirely across the car; *short carlines* or *deck carlines*, which are confined to the upper-deck, and *rafters*, 16, fig. 186, which are confined to the lower deck. The carlines of freight cars are also rarely called rafters. The main carlines are usually *compound*, fig. 647, *i. e.*, built up of wood and iron. They sometimes pass directly from side to side of the car across and under the upper-deck, when they are termed *continuous* or *straight* carlines, but usually are bent to the outline of the clear-story, when they are termed *profile* carlines. In freight cars the *main carline* is one made stronger than the others for carrying the purlins and roof. Other carlines having special names, which see, are

*End carline.* *Platform-roof carline.*  
*Platform-hood car-* *Platform-roof-end carline.*  
*line.*

**Carlton & Stroudley fastening** (steel-tired wheels). Fig. 2156. See *Tire fastening*.

**Car-mouldings**. Figs. 1050-64. See *Mouldings*. See also *Car-seat mouldings*, figs. 1199-1204, which latter are metal bands for seat-backs.

**Car-perch** (tip cars). 26, fig. 143. Another name for *draw-timbers*; derived from the *perch* of wagons, which is the pole connecting the front and hind gear of a spring carriage. The term car-perch is usually applied to the draw-timbers only when iron channel-bars are used in the place of wood. A patented form is the *Richards car-perch*, not illustrated.

**Carpet eyelet**. Figs. 802-5. See *Eyelet*.

**Carpet-knob**. Fig. 805. An *Eyelet-nail*, which see.

**Car-platform**. 34, figs. 155-183; 104, figs. 1843-4. More commonly, simply *Platform*, which see.

**Car-pump**. A *Basin pump*, which see.

**Carriage, or railway carriage** (English). Figs. 204-207. American equivalent, *passenger car*, or *coach*. A vehicle for passengers, having four, six, eight or twelve wheels (usually six wheels). It is divided into compartments by *partitions*. A *first-class* compartment seats six or



eight passengers, and a *second* or *third-class* compartment ten passengers. About 85 per cent. of the total number of passengers travel third class, which really corresponds to the so-called "first-class" here, the real first-class being carried in sleeping and parlor cars. The English first-class is used by about 8 per cent. of the passengers. The second is an intermediate class which is gradually going out of use.

See also *Bogie carriage*.

*Composite carriage.*

*Corridor carriage.*

*First-class carriage.*

*Lavatory carriage.*

*Saloon carriage.*

*Second-class carriage.*

*Smoking carriage.*

*Sleeping carriage.*

*Third-class carriage.*

*Tri-composite carriage,*

*or tri-compo.*

**Carriage truck** (English). An open four-wheeled vehicle, with low sides, adapted to run on passenger trains, and carry a road vehicle.

**Carriage-bolt.** Fig. 1867. A bolt made square under the head so as to prevent it from turning when in its place. They usually have button-shaped heads and are used for fastening wooden objects together.

**Carrier.** See *Brake-hanger carrier.*

*Foot-rest carrier.*

*Parallel brake-hanger*

*carrier.*

*Spring-plank carrier.*

**Car-roof.** Figs. 664-675. A covering for a car, supported by the carlines and purlins. The various forms in use in freight-car construction may be divided generally into the three following classes: 1st, what is known as a *double-board roof*, with or without felt or other material between boards. Fig. 666 is a simple and very largely used form. To this class belongs also the *Hutchins roof*, in which the boards are united by a kind of dove-tail joint with a sheet of painted canvas between them, and many others. 2d, *Single-board roofs*, covered with tin or other sheet metal, as figs. 664-5. 3d, Roofs made of metal sheets, fastened to purlins and roof strips, and protected by a single layer of roughly-matched boards. To this class belong the *Winslow*, figs. 670-75; "*Empire*," figs. 667-69, and many other less common forms. The "*Chicago*" car-roof is very similar to the *Winslow*, except that in the *Winslow* the corrugated sheets run clear across the roof of the car, whereas in the *Chicago* they are divided by the ridge-pole. Passenger-car roofs are commonly merely painted tin, zinc, or galvanized iron or steel of about 22 W. G. For street-cars, painted canvas is used. See

also *Board-roof*, and the various kinds above specified. In respect to form, see *Arched roof*, *deck*, **A** *car-roof*, and **X** *car-roof*. Figs. 649-50.

**Carry-iron.**

See *Drawbar carry-iron*. *Inner drawbar carry-iron*. *Draw-timber carry-iron*.

2. (Cowell platform and coupler.) 9, fig. 540. More properly *Stirrup*, which see.

**Car-seal.** Figs. 1110-19, 1011-18. A device to secure freight-car doors against opening by making it impossible without destroying the seal. The original form consisted of a lead disk with two holes to receive a piece of twisted wire, which is compressed by a die so as to leave a seal-mark which must be defaced or the wire cut before the door can be opened. To prevent stripping the seal from the wire and re-inserting it, a detective wire of irregular cross-section is used, fig. 1117. Sheet-metal *eyelet-shackles* in a variety of other forms are now also used, with or without tin *return-tags*, and also a simple lead rivet with a tin shackle. Tin shackles often have the name of the road printed on them.

**Car-seat.** Figs. 1120-1204; 122, figs. 155-85, 1120-23; also 1123-60. The complete set of fixtures on which passengers sit in a car. It ordinarily consists of a *seat-frame*, *seat-cushions*, *seat-back*, *arm-rest*, *foot-rest*, and their attachments. Ordinarily, the seats in American cars are placed cross-wise of the car, and are made for two passengers. The backs of the seats are generally made reversible. In the *Buntin seat-end*, which see, figs. 1139, etc., the seat and back are in one piece and both reversible together. These seats, and less properly, ordinary car seats, are sometimes called *reversible seats*. The seats of parlor cars are commonly called *chairs* (see *Revolving chair*, *Hartley chair*, etc.), and in certain old-style sleepers *sofas*, placed longitudinally against the side of the car, are used, as they are yet to some extent in the state-rooms, etc., of ordinary parlor and sleeping cars. In order to give an inclination to the seats which shall make them more comfortable, various devices, as the *adjustable roller-seat*, *Buntin's reversible seat*, *Gardner's geared seat-arm*, and *Mason's rocker-seat*, which see, have been introduced. The covering of seats is usually plush, but sometimes *cane* or *rattan* seats, *canvas-lined* cane seats, *perforated veneer* seats, *woven-wire* seats, which see, are used. The seats of *street-cars* are usually placed

longitudinally on each side of the car, as shown in figs. 1843-4, extending its full length, and the passengers sit facing each other.

See *Cane-seat*.

*Mason rocker-seat*.

*Perforated-veneer seat*.

*Rattan car-seat*.

*Side-seat*.

*Woven-wire seat*.

**Car-seat mouldings.** Figs. 1199-1204. Metal bands, usually nickel-plated, used to finish seat-backs. They are either *plain* or *beaded*. See *Mouldings*.

**Car-signal valve** (Westinghouse train signaling app's, which see). Fig. 638. A valve placed in every car and attached to the bell-cord or signal-cord, by which air is allowed to escape from the *signal-pipe*, thus blowing the *signal-whistle* on the engine.

**Car-spring.** Figs. 2031-2106. See *Spring*. *Spiral spring*. *Elliptic spring*. *Bolster-spring*. A general term applied to springs on which the weight of a car rests, and also to draw and buffer springs.

**Car-steps.** Figs. 686, etc. See *Platform steps*.

**Car-truck.** Figs. 1907-69. Mechanically, a small low four-wheeled (or sometimes six-wheeled) car, carrying as a dead load one-half the weight of a long car-body by means of a pair of *centre-plates* (truck centre-plate and car-body centre-plate), with a *centre-pin* or *king-bolt* passing through them, about which the truck or, more properly speaking, the car-body, can swivel. In England such trucks are called "bogies." See *Truck*.

**Carving-table** (dining cars). Fig. 193, etc.

**Car-washer.** Fig. 1879. A brush made for wasbing the outside of passenger cars. They are made of bristles or feathers.

**Car-wheel.** Figs. 2124-80; 1, figs. 1907-67; 25, fig. 2002. A wheel for a railroad car. Such wheels are usually made in this country of cast-iron with a *chilled* tread and flange, but a great and increasing proportion of passenger wheels are *Steel-tired*, which see. Chilled-wheels are called *single-plate wheels* or *double-plate wheels*, according to the number of cast plates connecting the hub and tread. When one plate is used, it is sometimes made flat, with ribs called *brackets* on the back, and sometimes *corrugated*, without ribs. The disks of double-plate wheels also are generally corrugated. What is known as the *Washburn* wheel has two corrugated disks extending from the hub about half way to the tread, and a single plate, with curved brackets on the back, between

the tread and the double plates. Cast-iron wheels are also made with spokes, either solid or hollow, principally for locomotive use.

An average weight of standard 33-inch wheels is 525 lbs. The approximate standard section of tread in the best modern practice is shown in fig. 2150.

The standard diameter of car-wheels may be said to be 33 in., but the Baltimore & Ohio and some other lines used until recently 30 and 31-in. wheels, and wheels as small as 28 in., and even less, are used for locomotive trucks. Forty-two-inch wheels are now becoming very common in passenger service, occasionally chilled cast-iron wheels, but usually steel-tired, which see. In England passenger wheels vary from 42 to 48 in. in diameter, and freight-car wheels are always 36 in. Both have always steel or wrought-iron tires.

Prices of wheels and axles and cost of work on same has been fixed at various rates by the rules for interchange of cars of the M. C. B. Association, as follows:

	1883-4.	1882.	1879 to
One new 36-inch wheel (less defective) on same axle	\$11.00	\$12.00	
Two " " " " " "	21.00	23.00	
One " 33 " " " "	8.00	9.00	
" " " " (less second-hand) " " "	6.00	.....	
Two " " " " (less defective) " " "	16.00	17.00	
" " " " (less second-hand) " " "	12.00	.....	
One new axle-turned and fitted (less defective)	8.00	8.00	
" " " " (less second-hand)	4.00	.....	
Second-hand wheels (less defective), per wheel or per pair	2.00	2.00	
Loose wheels refitted on second-hand axle, per wheel or per pair	2.00	2.00	

The parts of wheels are the *flange*, *tread*, *rim*, *face of rim*, *tire*, *retaining-rings*, *plate*, *ribs*, *spokes*, *centre*, *hub* and *axle-seat*.

The varieties of cast-iron wheels beside the single-plate, double-plate and Washburn, above mentioned, are the *broad-tread* or *compromise wheel*, *combination plate-wheel*, *combination wheel*, *hollow-spoke wheel*, *open-plate wheel*, *spoke-wheel*, *Hamilton steeled wheel*, *Thatcher corrugated wheel*. The *Saxe & Kear wheel* is a wheel cast on to an iron or steel tire. *Cast-steel wheels* have been made, but can hardly be said to be in use. See *Steel-tired wheel* and any of the above.

**Car-window blind** (Wilson's flexible, which see). Figs. 1645-7. See also *Window-blind*.

**Car-window brush.** Fig. 1879.

**Case.** "A covering, box, or sheath; that which incloses



or contains: as a case for knives: a case for books; a watch-case: a pillow-case."—*Webster*.

See <i>Brake-hose coupling-case.</i>	<i>Lock-case.</i>
<i>Door-case.</i>	<i>Leakage-valve case.</i>
<i>Lamp-case.</i>	<i>Spring-case.</i>
	<i>Triple-valve case.</i>

2. (Gouge heater.) Figs. 1409-12. An outside shell, consisting of a double layer of sheet metal for inclosing the various cold and hot air pipes.

3. (Rack-tumbler spring padlock.) 8, fig. 1031.

**Casing.** 1. (For heaters.)

See <i>Heater-pipe casing.</i>	<i>Perforated smoke-pipe casing.</i>
<i>Inside-casing.</i>	
<i>Outside-casing.</i>	<i>Smoke-pipe casing.</i>

2. (For Spear heater.) 16, figs. 1486-9: fig. 1522. A cylindrical sheet-iron cover by which the fire-pot is inclosed so as to leave an air-space between the two.

3. (Inside and outside) (suspended heater.) B and C, figs. 1529-32.

4. (For windows.) 7, figs. 679-81, 692-5. The frame which surrounds a window. See *Window-casing*.

**Casing-ring** (Bissell heater). Figs. 1355, 1381.

**Caster-holder** (dining-cars). Fig. 1540-5; and fig. 214. A shelf or tray for holding bottles of condiments.

**Cast front** (Gouge heater). Fig. 1408½. The part to which is attached the feed-door (12), draft doors (22 and 23), dust-door (21) and grate-slide (34). It is fastened to the front of case (87).

**Cast-front binder** (Gouge heater). Fig. 1364. A U-shaped band uniting the cast front to the case.

**Casting.** Any piece of metal which has been cast in a mould.

See <i>Corner-casting.</i>	<i>Roller side-bearing casting.</i>
<i>Drawbar side-casting.</i>	
<i>Eccentric-lever casting.</i>	<i>Roof corner-casting.</i>
	<i>Side-casting.</i>
	<i>Transom-casting.</i>

**Cast-iron stove.** Fig. 1479. A common form of cheap stove, always understood to be of an egg-shaped form approximately similar to fig. 1479, and used for caboose cars and other localities where appearance is not an object. Sometimes also called *egg-shaped stove*. Nearly all forms of coal stoves are chiefly made of cast-iron, but are not so termed.

**Cast-iron top** (Baker heater). 8, fig. 1301; fig. 1309. A plate which forms the top of the fire-chamber. It has

perforations around the outside and an opening in the centre through which the stove is supplied with coal.

**Caster.** Figs. 1146-8. A small wheel on a swivel attached to furniture and on which it is rolled on the floor. By custom of the trade, furnishings which are in reality mere sockets or knobs, like figs. 1145 and 1148, are termed *casters*, although they are, strictly speaking, not such, not having any rollers. The same is true of fig. 1545, *table-caster*. They are distinguished as *chain-casters*, *table-casters*, *sofa-casters*, etc., according to size and probable use.

**Cast wheels.** Figs. 2124-51. See *Car-wheel*. *Chilled wheel*.

See <i>Cupboard-catch.</i>	<i>Ratchet catch.</i>
<i>Deck-sash catch.</i>	<i>Second catch.</i>
<i>Door-holder catch.</i>	<i>Sliding-door-holder catch.</i>

2. (Janney coupler.) 3, figs. 542-554, 555-601. A latch which engages with the point of Janney knuckle and secures it in position when coupled.

**Catch-lever** (Janney coupler). 22, figs. 542-554, 555-601. A crank-lever passing vertically through the catch, by means of which it is caused to release the knuckle for uncoupling.

**Catch-spring** (Janney coupler). 25, figs. 542-554, 555-601. A coiled spring on the catch-spring bolt operating the catch.

**Catch-spring bolt** (Janney coupler). 15, figs. 542-554, 555-601. The bolt on which the catch of Janney coupler slides.

**Cattle-car.** Figs. 5-7, 33, 34, 132-8. More properly *Stock-car*, which see.

**Cattle-wagon** (English). American equivalent, *four-wheeled stock-car*. A four-wheeled vehicle suitable for freight service, and adapted to carry cattle, sheep or pigs. The floor boards are laid 1 inch apart to facilitate drainage, and are covered with strips to prevent the cattle slipping.

**Ceiling.** The inside or under surface of the roof or covering of a room or car opposite the floor. This term is sometimes used to mean *Sheathing*, which see. When the ceiling of a passenger car is made of painted canvas, as is the usual and formerly universal custom, it is termed *head-lining*; the term *ceiling* in modern usage being restricted to wood ceiling. The term *panel-ceiling* is also used as synonymous with wood ceiling, although

- cloth head-lining is also sometimes put on in panels. *Deafening ceiling*, which see, is boarding under the sills of the car, making an air-space between the sills.
- Ceiling-veneers.** Thin boards with which the ceilings of passenger-cars are covered.
- Central filling-piece** (steel-tired wheels). Figs. 2163-4, etc. The part surrounding the hub and connecting it with the tire. Also termed the *skeleton*. A *wheel-centre* is a hub and central filling-piece combined in one.
- Centre-bearing.** Figs. 215-25, etc., etc. The place in the centre of a truck where the weight of a car-body rests. A *body centre-plate* attached to the car-body here rests on a *truck centre-plate* attached to the truck. The general term *centre-bearing* is used to designate the whole arrangement and the functions which it performs in distinction from *Side-bearing*, which see.
- Centre-bearing arch-bar.** 66, figs. 1969-70. See *Centre-bearing bridge*.
- Centre-bearing beam.** B<sub>2</sub>, fig. 1971; 65, figs. 1969-70. See below.
- Centre-bearing bridge** (six-wheel trucks). 66-7, figs. 1969-70. A longitudinal iron beam, formerly sometimes a wooden beam, the ends of which rest upon the *spring-beams* and by which the truck *centre-bearing beam*, 65, carrying the *centre-plates*, is supported. It consists of the *centre bearing arch-bar* and *inverted arch-bar*, inclosing between them the centre-bearing beam. *Truck side-bearings* similar in form to an arch-bar are also attached to the extremities of the spring-beams, connecting them together.
- Centre-bearing inverted arch-bar.** 67, figs. 1969-70; B<sub>2</sub>, figs. 1971-3. See above.
- Centre-block.** A *Centre-plate block*, which see.
- Centre body truss-rods.** Those nearest the centre, when two or more body truss-rods are used under each side of a car-body.
- Centre brake-lever** (Tyler, Elder and Tanner brakes). 9, figs. 229, 233, 234; 129, figs. 1843-6. A horizontal lever placed underneath the bottom of a car-body, and attached by a fixed fulcrum in the centre of the body and of the lever. It is connected to each of the brake-beams by *secondary brake-rods* attached near to the fulcrum, and to the brake-shaft on each platform by a *brake-shaft connecting-rod*.
- Centre brake-lever chain** (Elder brake). 10, fig. 234. A chain which runs over the *centre brake-lever sheaves*, on the centre brake-lever.
- Centre brake-lever sheave** (Elder brake). 11, fig. 234. See above.
- Centre brake-lever spider.** 130, figs. 1843, 1846. A wrought-iron support, resembling the letter H, for the centre brake-lever.
- Centre-buffer follower-guide** (Janney-Miller coupler). 100, figs. 542-554, 602-35. The guides, bolted to the inside of the main knees, upon which rests the centre buffer-spring follower.
- Centre buffer-spring** (Janney coupler). 26, figs. 542-554, 555-601. A spiral spring situated above the two draft springs, intended for buffing purposes only.
- Centre buffer-yoke** (Janney-Miller coupler). 44, figs. 542-554, 555-601. The yoke connecting the central Miller buffer with the Janney equalizer.
- Centre counterbrace.** 165, fig. 159. A counterbrace in the body of the car between the trucks, to stiffen a compression-beam brace. See *Counterbrace*.
- Centre cross-bar** (English). See *Brake-shaft cross-bearer*.
- Centre door-hinge and stop** (English). 179, fig. 205. The centre of three brass hinges securing the door to the body. The insertion of two rubber plugs into striking pieces or side wings on the hinge constitute Cross' patent stop, which is used to prevent the door striking the outside of the body when thrown violently open. See also *Seat-rail support*.
- Centre door-rail.** See *Middle door-rail*.
- Centre-draft drawbar.** 32, figs. 161-8. A drawbar which is connected directly with the king-bolt of a truck. It is a style specially designed for use on the very sharp curves (of 90 and 100 ft. radius) of the New York Elevated railroads, and at present confined to those lines.
- Centre draft-tube** (Argand lamp). a, figs. 849-50. The hollow passage for air in the centre of the burner.
- Centre draw-rods** (Hoit double-spring draw-gear). 6, figs. 426-7. Two rods tying together the needle-beams or cross-frame tie-timbers, and serving to make the draw-rods continuous. Also called *cross-frame tie-rods*.
- Centre floor-timbers.** 4, figs. 82-185. The *Centre-sills*, which see.
- Centre-girth.** 178, figs. 93-6. See *Door-centre girth*.
- Centering-gauge** (M. C. B. standard which see). Fig. 2114. A gauge to fix the middle point of an axle.



**Centre-lamp.** 135, fig. 158; figs. 827-868. A lamp suspended from the centre of the ceiling of a car. The term is used to distinguish *centre-lamps* from *side-lamps*, the latter being attached to the sides of cars. Centre-lamps having two or more burners are commonly called *chandeliers*, figs. 834-48.

2. (Pintsch gas-burner, which see). Fig. 816.

**Centre-piece** (engine and air-pump of Westinghouse brake). 4, figs. 293-4; 298-9, 306. An iron casting which forms the lower head of a steam-cylinder, and the upper head of an air-cylinder.

**Centre-pin, or king-bolt.** 9, figs. 215-17, etc.; 18, figs. 82-92, etc. A large bolt which passes through the *centre-plates* on the body-bolster and truck-bolster. The truck turns about the bolt. It normally has no strain upon it and no key or nut at the lower end. It is therefore a mere pin and not a bolt in the usual sense, but in wrecking cars the centre-pin is sometimes provided with *keys* to fasten the truck and car-body firmly together, as **K**<sub>2</sub>, figs. 144-9. The name king-bolt is derived from the name of the corresponding part for the front wheels of a wagon. *Centre-pin*, however, is the more common term.

**Centre-plate.** Figs. 1930, 2107-9. One of a pair of plates, usually made of cast iron, which support a car-body on the centre of a truck. There are two, the *body centre-plate* and the *truck centre-plate*, which are sometimes also called the *male* and *female* centre-plates. The *centre-pin* or *king-bolt*, which see, passes through them but carries none of the strain except in emergencies. See *Swinging-platform centre-plate*.

**Centre-plate block.** 64, figs. 1913-29, 1956-67. A piece of wood placed under a truck centre-plate to raise it up to the proper height.

**Centre-rod** (Harrison postal-car chandelier), **F**, figs. 841-2. A rod through the centre of the *centre-stay*, carrying the revolving lamp-disks.

**Centre-shaft** (hopper-bottom cars). 129, figs. 105-8, etc. A *Winding-shaft*, which see.

**Centre-sills.** 4, figs. 82-143, 155-185, etc. The two main longitudinal timbers underneath the floor which are nearest the centre of the car. In iron-frame cars they are usually I-beams, which see. **A**<sub>2</sub>, figs. 144-9.

2. (Hand car.) 10, figs. 1720-3.

**Centre-spring washer** (Janney coupler). 32, figs. 542-554,

555-601. The washer against which the Janney *centre buffer-spring* impinges.

**Centre-stay** (of a chandelier). 30, figs. 835, 838, etc. The central support around which the lamps are grouped. In some cases it is the only method of attaching the chandelier to the ceiling, and in others there are several inclined *roof-braces* or vertical *lamp-arms* in addition. In "*hurricane*" or "*tornado*" lamps, which see, the centre-stay is usually a hollow tube for the passage of air.

**Centre-stop** (tip-car). 161, fig. 143. A bracket or block attached to a draw-timber to restrain the body from moving longitudinally.

**Chafing-plate.** A metal plate to resist wear, used on brake-beams, truck-transoms, swinging spring-beams, etc.

See <i>Brake-beam chafing-plate.</i>	<i>Drawbar chafing-plate.</i>
<i>Check-chain chafing-plate.</i>	<i>Transom chafing-plate.</i>
	<i>Truck-bolster chafing-plate.</i>
	<i>Coupling-pin chafing-plate.</i>

2. (Janney coupler.) 109, figs. 542-54. A bar across the top of the stirrup.

3. (Janney-Miller coupler.) 50, figs. 542-554, 555-601. See above.

**Chain.** "A series of links or rings connected, or fitted into one another, usually made of some kind of metal."—*Webster*.

See <i>Basin-chain.</i>	<i>Hoisting-chain.</i>
<i>Berth-chain.</i>	<i>Horizontal brake-shaft chain.</i>
<i>Brake safety-chain.</i>	<i>Lock-chain.</i>
<i>Brake-shaft chain.</i>	<i>Man-hole-cover chain.</i>
<i>Centre brake-lever chain.</i>	<i>Pitch-chain.</i>
<i>Check-chain.</i>	<i>Platform-railling chain.</i>
<i>Connecting-chain.</i>	<i>Railing-chain.</i>
<i>Coupling-chain.</i>	<i>Safety-coupling chain.</i>
<i>Coupling-pin chain.</i>	<i>Tank-nozzle-cap chain.</i>
<i>Door-pin chain.</i>	<i>Uncoupling-chain.</i>
<i>Driving-chain.</i>	<i>Wedge-chain.</i>
<i>Drop-bottom chain.</i>	

**Chain and eye** (for door-bolt, postal car fittings). Fig. 1083.

**Chain coupling-link.** 1, fig. 440. Two or more coupling-links attached together like a chain. Used with a *draw-hook*, which see.

**Chain-box** (of a derrick). **H**, fig. 145. A box below the hoisting-gear at the foot of the boom for holding loose chain or rope.

**Chain-holder** (for basin-plug). Fig. 1580. A *stanchion*

- which see, provided with screw-thread and nut for passing through the marble slab.
- Chain-lock** (for glass seals). Fig. 1016. One of the simplest forms of seal locks, relying solely for security on the protection of the seal.
- Chain-plate** (Gouge heater). 89, fig. 1412. A plate for attaching the chain which controls the injector-valve.
- Chair**. Figs. 1154-66. The usual designation for the seats of parlor cars. See *Revolving-chair*. *Hartley chair*. *Horton chair*.
- Chair-arm plate**. Fig. 1123. A metal plate for the top of a chair-arm. If for common passenger-car seats it is called an *Arm-cap*, which see.
- Chair-back** (Hartley chair). 9, figs. 1154-8.
- Chair-car**. Figs. 53, 159-60. Another name for *parlor* or *drawing-room* cars, which see, fitted with arm-chairs, which are usually adjustable arm-chairs, like the *Hartley* or *Horton*, which see, when this distinctive name is used.
- Chair-caster**. Fig. 1147. See *Caster*.
- Chair-leg caster, or socket**. Figs. 1145, 1148, 1545. A hollow casting which fits on the end of a chair-leg. Such casters, when casters proper, are provided with wheels, but frequently in car construction they are without wheels, and are then by custom of the trade still called *casters* (*fixed* or *rigid casters*), although properly not such.
- Challender truss**. Fig. 185b. A substitute for the truss-plank and side body-brace of passenger-car frames. It consists of a thin plate of iron with a 2 × 2 in. angle iron riveted to the top and bottom. It is fastened to each post by large wood screws, and is bolted to the side-sills. It serves also as a substitute for truss-rods under the car, and forms a part of the inside finish under the window. Cars trussed in this way are said to be as light and cheap as those in which the ordinary form of construction is used, with the advantage that they are more easily repaired, as the posts are not cut into. Two trusses in a car 64 feet long weigh about 1,600 lbs., and cost (in 1884) about \$90 to put in the car.
- Chamber**. See *Dust-guard chamber*. *Fire chamber*.
- Chamber-cap** (Westinghouse brake). See *Right chamber-cap*.
- "Champion" lamp-burner**. Fig. 899. One of the no-chimney burners.

**Chandelier**. Figs. 834-50. A centre-lamp having two or more burners, but generally meaning only those of very elaborate form or having more than two burners, as the four-light *postal-car chandelier*, figs. 840-2, which see.

2. (Pintsch gas apparatus, which see.) Fig. 827.

**Channel bar**. A, fig. 148; 25, fig. 1821. A general term applied by makers to iron rolled with the following section: [ They are usually used for the side-sills of iron-frame cars, *I-bars*, which see, being used for the inside sills.

**Chaplet**. A piece of iron used in a mould for casting, to hold a core in its place.

**Chase refrigerator car**. An ice and salt car. In each end of the car are placed five cylinders, seven feet high by sixteen inches diameter. In the centre of each cylinder is a pipe larger at the top than at the bottom. The cylinders are filled from the roof with broken ice. Drainage is had by a valve at the bottom of the cylinders operated by a rod running to the top.

**Check-chain**. 68, fig. 1963; 18, figs. 155, 158-60. A chain attached to a truck and the body of a car to prevent the former from swinging crosswise on the track in case the wheels leave the rails. Such chains are usually attached either to two, or to each of the four corners of a truck and to the sills of the cars.

At 8th Annual Convention, Cincinnati, 1874, it was

"*Resolved*, That truck and car-body check-chains are, when properly applied, a valuable acquisition on passenger equipment, and your committee recommend their general use."

The difficulty with most check-chains is that the *eyes* by which they are attached to the body and truck are not strong enough to resist the strain, and that the chains themselves are too long to come to a bearing soon enough to have the trucks controllable.

**Check-chain chafing-plate**. A plate attached to a truck-timber to resist the wear of a check-chain.

**Check-chain eye**. See *Body check-chain eye*. *Truck check-chain eye*.

**Check-chain hook**. See *Body check-chain hook*. *Truck check-chain hook*.

**Check-plates** (American automatic compression brake). 22, figs. 368-9. Cast plates sustaining the pawl which engages with the pendent lever.

**Check-valve** (Westinghouse driving-wheel brake). A



valve in the pipe which connects the brake-cylinder with the air-reservoir. The pressure in the reservoir causes the valve to seat itself or close. The air must then flow through a small hole which is drilled in the valve, which prevents the brakes from being applied too suddenly. When the brakes are released, this valve unseats, and permits a quick escape of the air. The valve is now little used. See note to fig. 297. See *Double-check valve*.

**Chill.** A kind of crystallization produced when some special kinds of melted cast-iron are allowed to solidify in contact with a metal (usually iron) mould. The hardened part of a car-wheel is called the *chill*. The mould in which a chill is produced is sometimes called a *chill*, but the name *chill-mould* has been given to this. The standard diameter for chill-moulds, recommended at the 16th Annual Convention, Philadelphia, 1882, for 33-in. wheels, is  $33\frac{1}{2}$  in. at the point indicated in fig. 2150, and for 30-in. wheels,  $30\frac{3}{8}$  in. Chilling was invented in Philadelphia in 1847. The name of the inventor is not preserved. The process was never patented. All cast-iron railroad car-wheels are chilled wheels. But few kinds of iron have the property, and the philosophy of the process is not fully understood.

**Chill-crack.** An irregular crack developed in casting upon the chilled surface of the tread of car-wheels. Chill-cracks not over  $\frac{1}{8}$ -in. wide, and not extending to the flange, are not considered as injuring the wheel or as indicating weakness or inferior quality. Iron which makes the most durable car-wheels is most liable to chill-cracks.

**Chilson stove.** Fig. 1478. A stove for heating cars, named after the manufacturer.

**Chimney** (for lamps). Figs. 926-936. See *Lamp-chimney* for table of standard dimensions.

See also *Globe-chimney.* *Lamp-globe chimney.*  
*chimney.* *Smoke-pipe.*  
*Lamp-case chimney.* *Stove-pipe.*

**Chimney-holder and reflector combined.** Figs. 866, 938.

**Chipping** (of chilled car-wheels). A scaling off of small portions of the chilled metal, due to imperfect or irregular crystallization. Wheels chipped on the tread to a depth of more than  $\frac{1}{4}$  inch or leaving the tread less than  $3\frac{1}{4}$  inches, are rejected under rules for interchange of cars.

**Chord** (of a truss). 13, 14, figs. 2181-8. The long hori-

zontal members at top and bottom of a truss. The side-sills and plates of a car-body are top and bottom chords of the side trusses, but the terms are not used in car-building. In England, the chords are termed *booms*.

**Christie brake-shoe and head.** Figs. 239-40. One of the many forms of this detail in which combined strength and convenience of removal has been sought. See *Brake-block*.

**Chute** (feed-door, Bissell heater). Fig. 1356. The interior frame of the feed-door forming a passage for the fuel.

**Cinder-trap** (Gouge heater). 6, figs. 1405-7. A large receptacle and opening through the floor of the car at the bottom of the *injector-pipe*, in which cinders received with the exterior air supply from the injector may collect and be removed from time to time.

**Circulating-drum** (Baker heater). Fig. 1325; 23, fig. 1301. A cast-iron vessel with hemispherical ends, on top of the car, filled with water, and connected by two pipes with the *coil* in the stove and with the pipes which extend through the car. As the water in the coil becomes heated it ascends to the drum, and from there it descends through the other pipe to the *radiating pipes* in the car. After passing through them it is brought back by return pipes to the coil, when it is again heated. Thus a continuous circulation is kept up. A similar part in the Searle heater is called the *expansion-drum*.

**Circulating pipes** (Johnson and other heaters). Fig. 1472. A general name for the pipes which carry the steam or other heated fluid through the car and return it again to the heater. The term *radiating-pipes* is also used.

**Circular tail-light.** Fig. 962. See *Signal-light*.

**Clamp.** 1. "In general, something that fastens or binds; a piece of timber or of iron used to fasten work together."—*Webster*.

2. (Joinery). "A frame with two tightening screws, by which two portions of an article are tightly compressed together, either while being formed, or while their glue joint is drying."—*Knight*. See *Deck-sash quadrant clamp*. *Deck-sash pivot clamp*. *Platform-timber clamp*. *Ridge-clamp*.

**Clasp.** Fig. 1082. See *Door-bolt clasp*.

**Clearance** (of track gauge). The total difference between the gauge of the rails and the gauge of the exterior bearing surface of the flanges, which is at present fixed at about  $\frac{1}{4}$  of an inch. The method of testing wheels for

this purpose is by measurement of the distance in the clear from inside to inside of car-wheel. By resolution of the Master Car-Builders' Association, 1883, the standard clearance, fig. 1996, for flanges, was fixed at 4 ft. 5 $\frac{3}{8}$  in. The proposition to fix the limit at  $\frac{1}{2}$  in. either way from 4 ft. 5 $\frac{3}{8}$  in. is now pending. Until the thickness of flange, which now varies greatly, has been reduced to some standard, this proposition will still leave the clearance of the flanges a variable quantity.

**Clear-story.** 110-11, figs. 155-85. "An upper story or row of windows in a church, tower or other erection, rising clear above the adjoining parts of the building."—*Webster*. Also spelled *clere-story*.

Hence, the portion of a passenger car roof which rises above the roof proper, in the manner which is now customary in nearly all American passenger cars, has been termed the clear-story, and this name was exclusively used in the former edition of this dictionary. Since the issuing of the first edition the use of the term *deck* for clear-story seems to have become practically universal among car-builders and manufacturers, especially in compound words. Those manufacturers consulted have unanimously replied that they used no other term than *deck*, and that they do not find the term *clear-story* used in the letters received from railroad officers. Therefore the term *deck* or *upper deck*, which see, has been exclusively used in this edition in designating the various furnishings and parts of the framing formerly designated *clear-story*, as, *deck sill*, *deck sash*, *deck-sash opener*, etc., for *clear-story sill*, *clear-story window*, *clear-story window opener*. As a general name for designating the entire space included within the upper deck, however, the term *clear-story* seems to be quite frequently used.

The clear-story is a comparatively modern introduction in American car framing, its general use dating from about 1860. Certain forms of cars, as fig. 50, have no clear-story. The part corresponding to a clear-story in freight cabooses, figs. 44-7, is termed a *lookout*.

**Cleat.** "1. A narrow strip of wood nailed on in joinery. 2. A term applied to small wooden projections in tackle to fasten ropes by."—*Webster*.

**Cleveland truck.** A *Diamond-truck*, which see.

**Clevis.** "A stirrup-shaped metallic strap used in connection with a pin to connect a draft-chain or tree to a plow or other tool."—*Knight*. The term is applied to various kinds of irons resembling a plow clevis in shape, and also to bolts with forked ends. See *Boom-cap clevis*, *Brake-lever clevis*, *Draw-clevis*, *Hoisting-block clevis*.

2. (Of padlock.) 7, fig. 1031. The means for attaching the guard-chain which prevents carrying off the padlock when unlocked.

3. (Of pile-driving hammer.) 2, figs. 1821-4. See *Hammer*.

**Clevis-hook** (of "American" steam tender brake). 11, fig. 366-7. The connection of the brake-chain to the brake-lever.

**Clinch-nail.** A wrought-iron forged nail, so named because it can be bent or clinched without breaking. *Cut nails*, the common and cheapest kind, although of wrought-iron, will not clinch.

**Clinker-door** (and door frame, Bissell heater). Fig. 1395. The part commonly called ash-pit door.

**Clinker-grating** (Bissell heater). Figs. 1368-75. A second and lower grating to facilitate removal of clinkers.

**Clip.** A U-shaped strap for attaching any body, more particularly a pipe, to the side of a partition. See *Berth-spring clip*, *Deck-sash quadrant clip*, *Pipe-clip*.

**Closed-door stop** (freight-car doors). 72, figs. 82, 87, 93. A block of wood or iron to prevent outside sliding-doors from moving too far when they are closed. See also *Open-door stop*.

**Close return-bend.** Fig. 1337. A short cast-iron tube made of a U-shape, for uniting the ends of two wrought-iron pipes. It differs from an *open return-bend* in having the two branches in contact with each other.

**Closet.** 1. A small room, usually for storage. See *Linen-closet*, *Wine-closet*, etc., figs. 208-15. A *locker* is a closet of less than the full height of car, but this distinction is not always observed.

2. A retiring room for sanitary purposes, more commonly called a *Saloon*, which see.

**Closet-hopper.** Figs. 1090-6; 131, figs. 169-90. Also called *soil-hopper*. A metal or porcelain hopper used in saloons.

**Closet-hopper ventilator.** Figs. 1097-8. See *Bell's exhaust hopper-ventilator*.

**Cluster-spring.** Figs. 2067-2106. A *group-spring*. See *Spiral spring*.

**Clutch-coupling.** See *Brake-hose coupling*.

**Coach.** Figs. 48-63. A term used to designate cars for the conveyance of passengers, in distinction from freight, baggage and express cars. The term was originally proposed by John B. Jervis. See "Railway Property," page 178. By increasing usage the term is used as an equivalent for *day-car* in distinction from sleeping cars



as well as freight and baggage cars, but "sleeping coach" is a common expression.

**Coach-bolt** (English). American equivalent, *carriage-bolt*, which see.

**Coach-screw** (English). American equivalent, *lag-screw*, but *coach-screw* also used, as 20-21, fig. 273. A square-headed screw with a pointed end used to screw into wood.

**Coal-box** (suspended heater). H, figs. 1529-32.

**Coal-car**. Figs. 16-42, 105-15. A car especially designed for carrying coal. Ordinary platform-cars with side-boards are much used for that purpose; but the standards are four-wheeled or eight-wheeled cars, with drop-bottoms. Iron cars, with four, six and eight wheels, also with drop-bottoms, are also used. The modern tendency is to greatly increase their capacity up to 50,000 or even 60,000 lbs. Fig. 18 shows a 50,000-lb. coal-car, standard of the Pennsylvania Railroad.

See *Eight-wheeled car*.

*Four-wheeled car*.

*Hopper-bottom coal-car*.

*Iron-hopper coal-car*.

**Coal-hopper**. See above.

**Coal-oil burner**. See *Mineral-oil burner*. Figs. 872-906.

**Coat and hat-hook**. Figs. 1549, 1551.

**Coat-hook**. Figs. 1546, 1551.

**Cobb's sectional seat-cushion**. Figs. 1232-3. See *Seat-cushion*.

**Cobb's pivoted seat-arm**. Figs. 1132-3 and 1171. A device by which the seat-arm is hinged at the seat-back by a *swing joint*, so that in reversing the back is raised up, making a narrow 22-inch seat-back give as high a support to the back as a 28-inch seat-back hung in the ordinary manner. Also called Cobb's *striker-arm*, which see.

**Cock**. 55, fig. 311; figs. 1591-1602. "A spout; an instrument to draw out or discharge liquor from a cask, vat, or pipe."—*Webster*. See *Faucet* for the various forms, also

*Bibb-cock*.

*Combination-cock*.

*Compression faucet*.

*Drain-cock*.

*Draw-off cock*.

*Four-way-cock plug*.

*Main-cock*.

*Release cock*.

*Reservoir drain-cock*.

*Self-closing cock*.

*Stop-cock*.

*Telegraph-cock*.

*Three-way cock*.

*Vertical telegraph-cock*.

**Cocoa matting**. Matting for the floors of cars made from the *coir-fibre*, growing in East India and the east coast of Africa.

**Coil** (Baker heater). 20, figs. 1301, 1321. (Searle heater). A, figs. 1484-5. An iron pipe which is bent into a spiral form and placed next the fire, for heating water which circulates through the car.

**Coke car**. Fig 17. A gondola or flat car with extra high sides, made necessary by the light character of the load. Box cars are often used as coke cars.

**Cold-air conductor** (Bissell heater). Figs. 1361, 1402. See *Cold-air pipe*.

**Cold-air elbow** (Gouge heater). 57, figs. 1413-4.

**Cold-air pipe** (Spear heater). 2, figs. 1486-90. (Bissell heater). Fig. 1350. A pipe by which cold air is conducted from a hood on top of the car to the bottom of the stove, and into the air-space between the stove and the stove casing. In the Searle heater called the *cold feed-pipe*. In the Gouge, the *injector pipe*.

2. (Winslow heater.) Fig. 1523. A pipe surrounding the smoke-pipe and connecting with the *ventilator-jack* on the roof, through which the cold air is forced by the motion of the car down past the stove into the *hot-air box*. The usual size of pipe is 8½ in. diameter, the smoke-pipe inside being 5 in. diameter.

**Cold-air supply-pipe** (suspended heater). D, figs. 1529-1532.

**Cold feed-pipe** (Searle heater). F, figs. 1484-5. See *Cold-air pipe*.

**Cold-shot**. Small globules of iron resembling ordinary gun-shot, which are found in the chilled portion of cast-iron wheels.

**Collar**. "A ring or round flange upon or against an object."—*Knight*. Ordinarily an *axle-collar*, 3, below, is meant.

See *Deck-collar*.

*Dust-collar*.

*Expanding-collar*.

*Lamp-collar*.

*Reducing-collar*.

2. (Creamer brake, which see.) 11, fig. 263.

3. (Of journal.) F, fig. 1974; 32, figs. 116-119 and 204, etc. A rim or enlargement on the end of the car-axle which takes the end-thrust of the *journal-bearing*. A *muley axle* has no collar.

4. (For smoke-bell stem of Harrison postal-car chandelier.) C, figs. 841-2.

**Color-coat** (painting). The coats, usually three in number, which follow the *rough-stuff* or scraping filling-coat in painting car-bodies. The colors are mixed with turpen-

tine and driers, as little oil as possible being used, only sufficient to prevent the color from rubbing off. Twenty-four hours are allowed to each coat to dry, and the process of varnishing then follows, which varies greatly in the time and care given to it, but which is always very carefully done. See *Finishing varnish and painting*.

**Column.** 1. (Diamond and other trucks.) Fig. 1735; 37, figs. 1907-36. Another and perhaps more common name for a *Bolster guide-bar*, which see.

2. (Of crane.) **A**, fig. 145. Another name for the *mast*, especially when entirely supported from below.

3. (Hartley chair.) **12**, figs. 1154-8. See *Pedestal*.

**Column-bolt.** 109, figs. 1921-2. A bolt passing through the arch-bars and holding the column in place and the truck-frame together.

**Comb-rack.** Figs. 1582-4.

**Combination.** The following list of parts of the Janney-Miller combination coupler are designated sometimes with and sometimes without the prefix "combination." See *Janney-Miller coupler* and the names of the several parts, omitting the word "combination."

*Combination ball-joint washer.* 59, figs. 555-635.

" *barrel.* 40, figs. 542-554, 555-601. The barrel or shank to which the *Janney head* or *Miller hook* is secured.

" *chafing-plate.* 50, figs. 542-554, 555-601.

" *connecting-pin.* 64, figs. 542-554, 555-601.

" *end-face-plate.* 46, figs. 542-554, 555-601.

" *eye-bolt* (for *Miller hook*). 66, figs. 542-554, 602-35.

" *follower.* 99, figs. 542-554, 602-35.

" *follower-guide.* 100, figs. 542-554, 602-35.

" *head* (*Janney-Miller coupler*). 39, figs. 542-554, 555-601. A head for the *Janney coupler* substantially similar to the ordinary form, but adapted for use in the *Janney-Miller combination coupler*.

" *horn.* 48, figs. 542-554, 555-601.

" *Janney barrel.* 40, figs. 542-554, 555-601.

" *head.* 39, figs. 542-554, 555-601.

" *large equalizing-guide.* 47, figs. 542-554.

" *lever jaw-pin.* 97, figs. 542-554, 602-35.

" *Miller buffer.* 42, figs. 542-554, 555-601.

" *buffer-yoke.* 44, figs. 542-554, 555-601.

" *head.* 41, figs. 555-601.

" *stop.* 43, figs. 542-554, 555-601.

" *stop bolt.* 56, figs. 542-554, 602-35.

" *platform-lever jaw.* 58, figs. 542-554, 602-35.

" *platform-lever plate.* 57, figs. 555-635.

" *open link for Miller hook.* 98, figs. 542-554, 602-35.

" *platform-lever.* 69, figs. 542-554, 555-601.

" *pull-rod.* 53, figs. 542-554, 555-601.

" *side-spring.* 55, figs. 555-635.

" *bolt.* 52, figs. 542-554.

*Combination side-spring eye-bolt.* 67, figs. 542-554.

" *plate.* 45, figs. 542-554, 555-601.

" *plate washer.* 101, figs. 555-635.

" *stirrup.* 54, figs. 542-554, 555-601.

" *trigger.* 63, figs. 555-635.

" *washer.* 60, figs. 555-635.

" *small equalizing-guide.* 49, figs. 542-554, 555-601.

" *slop-brace, Janney.* 115, figs. 542-54.

" *stirrup.* 51, figs. 542-554, 555-601.

" *swivel.* 61, figs. 542-554, 602-35.

" *swivel-hook.* 62, figs. 542-554, 555-601.

" *trap-door.* 68, figs. 555-635.

" *spring.* 65, figs. 555-635.

" *yoke, Janney.* 9, figs. 542-554.

**Combination baggage-car.** Fig. 58. A baggage-car having compartments for express or mail, or both, as well as for baggage. See *Combination car*.

**Combination car.** Fig. 51. A passenger car, one portion of which is devoted to passengers and the other to the conveyance of mail, baggage or express. A *combination baggage-car*, which see, is also a combination car. Combination freight cars are also built, as *combined box and stock-car* (Fig. 9), but are not generally so termed, since they are not intended for more than one use at one time.

**Combination-cock.** Fig. 1602. (For Baker heater). 25, figs. 1301, 1328. A cock with funnel attached, used at the top of a tank for filling. When opened with the key it allows the inward passage of the water, and at the same time the outward passage of air through a separate channel. Hence the name.

**Combination elliptic-spring.** Fig. 2041. An elliptic-spring with which auxiliary rubber bearings at the ends are combined. The load, instead of resting on the centre of the spring, bears on two rubber bearings, each placed about one-third the length of the spring from the end. Little used.

**Combination single-plate wheel.** Fig. 2132. A wheel with a single centre-plate, but with a recess cast around the hub.

**Combination-wheel.** A term applied by Mr. Lobdell to a wheel which he patented, and which has a projection cast on the inside of the rim opposite to the flange.

**Combined label-holder and drawer-pull.** Fig. 1077.

**Combined reflector and chimney-holder.** Figs. 866-938.

**Combined triple-valve, reservoir and brake-cylinder** (Westinghouse freight brake). Fig. 352. To lessen the complication and reduce the cost of freight brake-gear



- these three parts, which are separate in passenger brake-gear, are combined in freight.
- Combined ventilating register and berth curtain-rod bracket.** Fig. 1272.
- Commode-handle** (English). 177, fig. 205. Nearest American equivalent, *body hand-rail*. A piece of brass or iron secured to the sides of the body, and shaped so as to be conveniently grasped by the hand in entering and leaving carriage or in passing along the train outside the carriages.
- Communication-cord pulley** (English). 170, figs. 205-7. American equivalent, *bell-cord pulley*. A small brass pulley fixed to the eave of the roof and carrying the *communication-cord* (bell-cord) running outside the train.
- Compartment** (English and American). Fig. 210, etc. A subdivision of a passenger car. In English carriages it runs entirely across the car. In American parlor and sleeping cars, in which alone compartments often occur, it runs only partially across, leaving room for a passage or *corridor* at the side. Often called *state-rooms*.
- Composite carriage, or composite** (English). A coach in which compartments for more than one class of passengers are provided. A compartment for baggage is generally included.
- Compound-bolster.** Fig. 225. A bolster composed of one or more sticks of timber stiffened with vertical plates of iron.
- Compound-carline.** Fig. 647 : 7, fig. 186 ; 100, figs. 155-78. A carline of which the main or central portion is made of wrought-iron, with a piece of wood on each side. They are commonly used for cars with clear-stories, and either extend directly from one plate to the other, or are bent to conform to the shape of the clear-story. In the latter case they are called *profile-carlines*. See *Carline*.
- Compound spiral-spring.** Fig. 2043. A spring with the spaces between the coils filled with India-rubber. (Nearly obsolete.)
- Compression-bar.** Figs. 217-20. See *Body-bolster compression-bar*.
- Compression-beam.** 1, fig. 644 ; 163, figs. 159-60. A horizontal timber in the center of the side of a car-body, which acts as the compression-member of a truss for strengthening the body. The *compression-beam brace*

abuts against it. An *end compression-beam*, fig. 159, is sometimes used. The compression-beam is sometimes made double, one above the other, with separate *braces* (*main compression-brace* and *centre compression-brace*) acting upon each, as in figs. 159-60.

**Compression-beam brace.** 2, fig. 644. A brace used in connection with a compression-beam to form a truss in the side of a passenger-car. It is sometimes stiffened by a *centre counterbrace*, 165, fig. 159 ; and sometimes two or more braces are used, as in fig. 159. They are then termed *main compression-brace*.

**Compression brake.** Figs. 368-9. A general term designating the class of brakes, none of which are in general use, which derive their power from the compression of the drawbars produced by momentum when brakes of an ordinary form are applied at the head of a train. A great variety of such brakes have been invented and patented, but the only one deemed to have obtained sufficient prominence for insertion in this volume is the "American Brake Co." compression brake, figs. 368-9. In that brake, when the drawbar is compressed the *push-bar* 15 catches the *pendant lever* 16, and so applies the brakes through the *lower connecting-rod* 23, the *relief-spring* 25, and the *three-holed clevis* 27. The principal difficulty and complication in this as in all other similar devices is to prevent the brake-gear acting when not desired, as when backing or in switching. To obviate this difficulty, so that the brake will only be applied when moving at a certain speed, *governor blocks* 2 are attached to an *axle-clamp* 1, and held in position by the *governor-block springs* 3. When a given velocity of revolution is attained centrifugal force throws the governor-blocks outward, moving the *disk* 5, and thence through the *fork* 6, *fork-bracket* 7, *tail-nut* 9, *lower bell-crank rod* 8, and *bell-cranks* 11, actuate the *upper bell-crank rod* 14, and the *push-rod* 15, causing the *locking-pawl* 17 to become engaged with the *pendant lever*, so that compression of the drawbar is able to act. After the speed is checked to a certain amount this operation is automatically reversed and the automatic brake-gear becomes once more disengaged from the drawbar.

**Compression-faucet.** Fig. 1596. A spring faucet with a flat disk on top, letting on the water by direct vertical compression. *Telegraph-cocks*, which see, are in a sense compression faucets, but are not so called.

**Compression-lever** (Cowell platform and coupler). 10, fig. 537. A *platform-lever*, extending above the car-platform, by which, with the aid of the *adjusting-wedge* (6) and other parts beneath the platform, the pressure of the *buffer-springs* (14) is applied to the buffers.

**Compression-member.** Any bar, beam, brace, etc., which is subjected to strains of compression, and forms part of a frame, truss, beam, girder, etc. *Struts*, *body-braces*, etc., are *compression-members*. Similarly *tension-member* is used for tensile strains.

**Compression-rod brake.** Fig. 227. An inner-hung brake with a single lever, which is connected with a brake-beam farthest from it by a rod or bar which is subjected to a strain of compression when the brakes are applied. The pressure on the brake-blocks is not equal. Figs. 249-51 is a better plan.

**Compromise-wheel.** A *broad-tread wheel*, which see, for running over slightly different gauges. Little used.

**Concave elliptic spring.** Fig. 2037. A style of spring in which the plates are dished or concave, with the object of stiffening the plates, holding them more firmly in their relative positions, and throwing the edges of the plates wholly into compression so as to diminish the danger of fracture by the gradual development of cracks.

**Concealing urinal.** One designed to be opened for use by a handle at the top, and then closed up flush with the wood-work so as to be invisible. They are in limited use but not generally approved.

**Concealing water-closet.** Fig. 213. A form of closet covered with a seat to resemble an ordinary chair or sofa.

**Condensing diaphragm** (refrigerator cars). D, fig. 131. Sheets of metal placed in the cold-air flue on which moisture may be precipitated.

**Conductor** (Tiffany refrigerator car). 2, fig. 130 a. The drip-pipe from the ice-pan. See also *Heat conductor*.

**Conductor's car.** Figs. 44-7, 104½. A *caboose car*, which see.

**Conductor's lantern.** Figs. 974-9. One with an extra sized *ball* attached to it by which it can be held on the arm, leaving the hands free. It is sometimes provided with a *reflector*, fig. 977. They are often elaborately finished and usually bear the name of the conductor cut on the globe.

**Conductor's-valve** (Westinghouse brake). 21, figs. 311,

293, 324-5. A valve for applying the train brakes placed at some convenient point in a car, usually in the saloon, and operated by a cord extending through the train within reach of the conductor.

**Conductor's-valve discharge-pipe** (Westinghouse brake). 24, fig. 325. A pipe leading from the conductor's valve down through the floor of the car.

**Conductor's-valve pipe** (Westinghouse brake). 23, fig. 664. Connects the brake-pipe with the conductor's-valve.

**Cone.** 1. (For berth spring.) 2, fig. 1249. A *berth-spring fusee*, which see.

2. (Graduated bolster-spring.) 2-4, figs. 2096, etc. A projecting sleeve on the spring-plates to serve as guides or distance for the springs. They are distinguished as *lower* and *upper*.

**Cone lamp-shades.** Figs. 942-4. See *Lamp-shade*.

**Coned closet-hopper.** Fig. 1091. See *Closet-hopper*.

**Congdon brake-shoe.** Figs. 239-40. A brake-shoe invented and patented by Mr. J. H. Congdon, Master of Machinery of the Union Pacific Railroad. It consists of a cast-iron shoe with pieces of wrought-iron cast in it in the face or rubbing surface so as to give it greater endurance. See *Brake-shoe*.

**Connecting chain** (pile-driver car). 44, fig. 1822. A *pitch-chain*, which see, connecting the *pitch-gear* on the two axles of a truck used for making the car self-propelling, which is hardly the common practice.

**Connecting-pin** (Janney-Miller coupler). 64, figs. 542-554, 602-35. The steel pin securing either the Janney *head* or the Miller *hook* to the shank of the Janney-Miller combination coupler.

**Connecting-rod.** Figs. 227-35. A rod which connects two or more parts or objects together. See *Brake-shaft connecting-rod*. *Floating-lever connecting-rod*.

2. (Creamer brake, which see.) 8, fig. 263.

3. (Hand-car.) 24, figs. 1720-23. The iron rod which connects the *bell-crank* and the *crank-shaft* together. In figs. 1724-6 there are two connecting-rods and they are attached directly to the propelling-levers.

4. (Hoit draw-gear.) 185, fig. 94. Two bolts on either side of the centre-sills connecting the two needle-beams or cross-frame tie-timbers together, thus serving, in connection with the draw-rod 182 to constitute in effect a continuous drawbar. Also termed *cross-frame tie-rods* or *centre draw-rods*.



**Continuous brake.** Any system of brakes so arranged that by connecting together the brake apparatus on the different vehicles forming a train it can be operated on all of them from one or more points on the train, as from the engine or from any of the cars.

See *Air brake.* *Smith vacuum brake.*  
*Eames' vacuum brake.* *Vacuum brake.*  
*Empire vacuum brake.* *Westinghouse air brake.*  
*Loughridge air brake.* *Westinghouse automatic air brake.*

**Continuous carline.** A *carline*, which see, which passes directly from side to side of the car, across and under the clear-story or upper deck, in distinction from a *profile carline* (fig. 646), which is bent to follow the outline of the clear-story.

**Continuous counterbrace rod.** The body counterbrace rods are sometimes combined into one long rod passing from one end of the car to the other, as in figs. 159-60, which is then sometimes termed a *continuous counterbrace rod*; also *inverted truss-rod* or *hog-chain rod*.

**Continuous drawbar.** Figs. 424-5. A patented draw-gear, having a continuous rod for tractive strains, relieving the draw-timbers. The *Hoit draw-gear*, figs. 426-7, is another device of the same general class.

**Continuous-frame truck.** A car-truck with an iron frame, the sides and ends of which are all made in one piece. Figs. 1948-53 are engravings of such trucks.

**Continuous top-side (English).** 69, figs. 118-119. Nearest American equivalent, *top-side rail*. A side-board run continuously from end to end of a wagon in order to stiffen it vertically and assist in tying the ends together.

**Continuous truck-frame.** 9, figs. 1948-50. An iron bar which is welded together in a rectangular shape so as to form the sides and ends of a truck-frame.

**Conway ball coupler.** One of those recommended for trial by the Master Car-Builders' Association. So called from using a ball like a pin. See *Automatic freight-car coupler.* *Automatic car-coupler.*

**Cook-stoves (emigrant cars).** Fig. 1483.

**Coolbaugh lamp-platform.** Figs. 1190-91. A device to facilitate access to the lamps, and avoid the necessity of standing on the seats.

**Coolbaugh's signal-holder.** Figs. 965-8.

**Cooper elastic wheel.** Figs. 2129-30. See *Elastic wheel.* *Steel-tired wheel.*

**Cope.** The upper portion of a mould or flask used in making metal castings.

**Coping (English).** 74, figs. 116-19. A bar of iron secured to the top of the sides and ends of a *gondola car* (*open wagon*), and protecting them from local distortion and the friction of a chain or any heavy body.

**Cord.** "A string or small rope composed of several strands twisted together."—*Webster*. See *Hat-cord*, *Window-curtain cord*, neither of which are used, however, to any appreciable extent.

**Cord-lever** (of car signal-valve, Westinghouse train signal app's, which see). 6, figs. 688-9. The lever by which a pull on the signal-cord actuates the valve.

**Cork wall** (refrigerator cars). C, figs. 130-130½. One of the means of insulation.

**Corner-casting.** A *Knee-iron*, or a *corner-plate*, which see. See also *Roof corner-casting*.

**Corner handle,** more commonly *grab-iron*, which see. 102, figs. 87-138.

**Corner pillar (English).** 94, figs. 204-207. American equivalent, *corner-post*. An upright piece at the corners of the body.

**Corner-plate** (freight-car bodies). 55, 56, 57, figs. 82-135. A wrought or cast iron angle-plate or knee on the outside corner, to strengthen and protect the frame. There are usually three corner-plates, *upper*, *lower* and *middle*. Very commonly a *push-block*, 191, fig. 96, is cast upon the lower corner-plate.

**Corner-post.** 43, figs. 82-142; 61, figs. 155-85. The upright stick which forms the corner of the frame of a car-body. The corner-post is omitted in a few *round-cornered cars*, figs. 190, etc.

**Corner-post brace** (tip cars). 163, fig. 143. A detail special to the car shown.

**Corner-post ornament.** An ornamental casting on the outside corner of a passenger car. Modern cars are not commonly so ornamented.

**Corner-post pocket.** 45, figs. 105, 107, 132-42. See *Pocket*.

**Corner-seat.** Figs. 1134-5. A seat for the corner of a car, the back of which is not reversible. They are called *left-hand* or *right-hand*, as for a person sitting in them.

**Corner seat-end.** Figs. 1190-2. A seat-end bracket secured to the wall of a passenger car for supporting the outer end of a *corner-seat*, which see.

**Corner-urinal.** Figs. 1100-5. So called in distinction from a side-urinal.

**Corner urinal-handle.** Fig. 1107. See above and *Urinal-handle*.

**Cornice.** 93 and 94, figs. 175-6. The mouldings at the eaves of the roof outside of a car, and where the ceiling joins the sides and ends of the car inside. There is, therefore, an *inside* and *outside cornice*. See also *Deck inside-cornice*, *Window-cornice*.

**Corridor** (Mann boudoir and other sleeping cars). Figs. 193, 211-2. A passage running at one side of the Mann car from one door to the other, affording access to the compartments. The Mann cars are the only ones in general use having such corridors for the whole length of the car, but all sleepers have longer or shorter corridors to pass the state-rooms, smoking-compartments, etc.

**Corridor-carriage** (English). A passenger-vehicle having a passage from end to end along one side, the various compartments having doors which open into this passage. Little used. See also *Carriage*.

**Corrugated car-wheel.** Figs. 2144-45. See *Car-wheel* and *Thacher corrugated wheel*.

**Corrugated key** (Yale lock, which see). Fig. 1028.

**Corrugated-metal car-roof** (freight cars). Figs. 664-9. A roof consisting of iron, steel, or zinc plates covered with boards, which run lengthwise, and rest on *roof-strips* on top of the rafters and carlines. Two forms are illustrated, the *Winslow* and *Empire car-roofs*, which see. See also *Car-roof*.

**Corrugated-mouldings.** 1 to 15, figs. 1050-64. See *Waved mouldings*.

**Corrugated-rubber floor-mat.** Fig. 807. So called in distinction from *perforated-rubber floor-mats*.

**Corrugated Yale lock.** Figs. 1027-28. See *Yale lock*.

**Corrugations** (Atwood hemp-packed wheel, which see). Fig. 2168.

**Corticine.** A form of floor-covering much like *linoleum*, which see, composed of linseed oil, prepared by a special process, mixed with ground cork and placed upon a strong backing of water-proof canvas.

**Counter-boring.** An enlargement or other alteration of form for a certain portion of its length of a hole bored in any substance. In slats, see *Wilson's flexible-car window-blind*, 6, figs. 1645-6.

**Counterbrace.** 3, fig. 644; 2, fig. 645; and 165-6, fig. 159.

In *bridge-building*, a brace which transmits strains in the opposite direction to a main brace, as 9, figs. 2181-8. In *car-building*, a counterbrace usually means a brace in the side of the body between its ends and the body-bolster. Sometimes, however, as at 165-166, fig. 159, there are two styles of counterbraces, one of which, 165, near the middle of the car, is alone a counterbrace proper, in the technical sense, and called *centre counterbrace*, while the other, 166, is designated as the *counterbrace*, and generally the only counterbrace recognized in car-building. See *Body counterbrace*.

**Counterbrace rod** (of a truss). 11, figs. 2183, 2185. An inclined rod which acts as a counterbrace. See above, and also *Body counterbrace-rod*.

**Coupler.** That which couples. In relation to cars the term usually designates the appliances for coupling or connecting cars together, and usually means some form of automatic coupler. See *Automatic freight-car couplers*, figs. 409-423, and *Blackstone, Cowell, Janney, Janney-Miller* and *Miller couplers* (passenger), figs. 537-643.

**Couplet** (of springs). 80, figs. 1912-27. Two elliptic springs, which see, placed side by side, to act as one spring. Three springs united in this way form a *triplet*, four a *quadruplet*, five a *quintuplet*, six a *sextuplet*.

**Coupling.** "That which couples or connects, as a hook, chain, or bar."—*Webster*. A coupling-link is often called simply a coupling.

See *Basin-coupling*,  
*Bell-cord coupling*,  
*Berth curtain-rod*  
*coupling*,  
*Brake-hose clutch-*  
*coupling*,  
*Brake-hose coupling*,  
*Clutch-coupling*.

*Coupling-link*,  
*Head-board coupling*,  
*Hose-coupling*,  
*Pipe-coupling*,  
*Reducing pipe-coupling*,  
*Screw-coupling* (Eng-  
lish).

**Coupling-bar.** 19, figs. 249-51. See *Brake-lever coupling-bar*.

**Coupling-bar pin** (brake gear). 20, figs. 249-51. A pin for the *Brake-lever coupling-bar*, which see.

**Coupling-cap.** See *Brake-hose-coupling cap*, figs. 327-8.

**Coupling-case.** See *Brake-hose-coupling case*, figs. 327-8.

**Coupling-chain, or chain-coupling-link.** 8, fig. 109. A three-link chain used in coupling to *draw-hooks*, which see. See also *Safety-coupling-chain*, figs. 428-30.

**Coupling-hook.** 11, figs. 636-43. A hook for coupling



cars together. See *Drawbar coupling-hook* (of Miller coupler). *Draw-hook*, fig. 440.

**Coupling-hose** (Eames' vacuum brake). Figs. 280-81. A flexible rubber hose lined with wire coil. Usual sizes, 1,  $1\frac{1}{4}$ , and  $1\frac{1}{2}$  in. diameter and 22 to 24 in. long.

2. (Westinghouse brake.) Fig. 293, etc. More commonly *brake-hose*.

**Coupling-link**. Figs. 431-5, 439, etc. A wrought-iron link or open bar by which freight cars with ordinary draw-heads are coupled together by *coupling-pins*. Coupling-links are often called simply *links* or *couplings*. *Bridge's* coupling-link is designed to prevent too rapid wear. *Crooked* coupling-links are kept on hand for use with draw-heads of unequal height. The *Potter* draw-head has a *fast* coupling-link. *Chain* coupling-links are used with draw-hooks. Link and pin couplings are very dangerous to trainmen, and some form of *automatic freight-car coupler*, which see, will probably soon be introduced as a substitute. See

*Chain coupling-link.*      *Fast coupling-link.*  
*Crooked coupling-link.*    *Triple coupling-link.*

2. (English.) 42, figs. 116-118. A link forming part of a *wagon-coupling* or *draw-chain*. The open-ended link connected to the draw-hook or draw-bar is the *coupling-shackle*. The intermediate links are sometimes termed the *short links*, and the end link the *long link*. A single long link is often used instead of three short intermediate links.

**Coupling-link rivet** (Potter drawbar). 1, figs. 449, 451.

The pin by which the fast coupling-link is attached.

**Coupling-pin**. 140, figs. 84-139; figs. 436-7, 443-6. A short bar of iron with which a coupling-link is connected to a drawbar. They are distinguished as *eye-head* or *solid-head*, or sometimes *bent-head*, fig. 446. They are also round, flat or oval. The Potter drawbar has a *fast* coupling-pin.

2. (Janney and Miller couplers.) 17, figs. 542-554, 555-601; 41, fig. 640. One carried for emergencies or occasional use, to couple with a link.

**Coupling-pin chafing-plate** (Miller coupler). 40, figs. 637-640. An iron plate attached to the outside of a platform end-timber to protect it from being worn by the *coupling-pin chain*.

**Coupling-pin chain**. 41, fig. 640. A small chain at-

tached to the car by a suitable *eye* to prevent the coupling-pin from being lost.

**Coupling-pin-chain eye**. 42, fig. 640. See above.

**Coupling-pin plate** (Miller coupler). 39, figs. 637-40. An iron chain on top of the platform end-timber near the outside end, and which forms a guard for a hole in the timber to hold the coupling-pin.

**Coupling-screw** (English). 43, figs. 204-207. A right and left handed screw used in a *Screw-coupling*, which see.

**Coupling-shackle** (English). 41, figs. 116, 118, 205 and 207. The end link of the coupling which is secured by a pin to the shank of the *Draw-hook*, which see.

**Coupling-sleeve** (Kirby's car-door lock). K, figs. 1003-4. A screw coupling making the door-knob spindle continuous.

**Coupling-spring** (Miller coupler). 49, fig. 636. A spring made of two or more flat and nearly straight plates which bear against the back of the drawbar coupling-hook so as to cause it to engage with the hook of the adjoining car; also called the *leaf-spring*.

**Coupling-spring bracket** (Miller coupler). 50, figs. 636-7. A cast-iron lug attached to one of the drawbar timbers, to which a bolt is fastened for increasing the tension on the coupling-spring.

**Coupling-valve**. See *Brake-hose coupling-valve*.

**Coupling-valve key** (Westinghouse brake). 48, fig. 311. Cover.

See *Drum-cover*.

*Journal-box cover*.

*Man-hole cover*.

*Moulding-joint cover*.

*Urinal-cover*.

*Window-moulding-joint cover*.

**Covered wagon** (English). A roofed vehicle used for conveying freight liable to be stolen or to be damaged by damp. It has side doors which can be locked, and occasionally doors in the roof so that the contents can be readily hoisted. As a rule, *tarpaulins*, which see, and open cars are used in England.

**Cover plate** (Atwood hemp-packed wheel). H, fig. 2167. A ring covering the packing inside the tire. A *face-plate* of a steel-tired wheel is a disk connecting the tire and hub.

**Cover-strip**. 1. (Refrigerator car.) L, figs. 130-130½. Metal plates covering a gutter in the floor.

2. (Of roof.) 1, fig. 665; 3, figs. 670-672½. A strip of metal, or sometimes wood, to cover a joint in the roof-sheets.

**Cowell buffer and coupler.** Figs. 531-541. A device for automatically coupling passenger cars and forming a continuous floor between them. Its buffer is also a supplemental platform, inclosing buffer-springs, and overlapping or inclosing the car sill. Such interaction between the coupler and the buffer exists as that when the coupler is drawn out and the draft-spring compressed the buffer moves out the same distance, thus keeping the twin buffers always in contact. The coupler is much like the Miller, but with its drawhead pivoted to the drawbar. It is easily uncoupled with one lever. See this device on Wagner and Pullman vestibule cars.

**Crabs, or tongs (pile-driver car).** 22, figs. 1821-4. (Wrecking car). Fig. 144. See *Tongs*.

**Crane (pile-driver car).** 34, figs. 1821-4. See *Pile-driver car* and *Derrick*.

**Crank.** 1. "Literally a bend or turn; hence an iron axis with a part bent like an elbow, for producing a horizontal or perpendicular motion by means of a rotary motion or the contrary."—*Webster*. See *Bell-crank*. See also *Brake-shaft crank*, *Door-shaft crank* (street cars).

2. (Of a derrick or crane.) 13, figs. 77-78; **W**, figs. 151-3. The L shaped handle by which the driving gear is actuated.

3. (Of a lever hand-car.) 5, figs. 1724-6. The *bell-crank* (which see) of a hand-car. 23, figs. 1720-3, is at the upper end of the connecting-rod, the *crank* at the lower end.

**Crank hand-car.** Figs. 1708-10. A hand-car which is worked by one or two cranks connected by gearing with the axles of the car. Originally in almost universal use, it is now nearly obsolete in favor of *Lever hand-cars*, which see.

**Crank-shaft (lever hand-cars).** 6, figs. 1726-23. A short wrought-iron shaft to which a crank of a hand-car is attached, which is turned by suitable levers and is connected by gear-wheels with one of the axles of the car.

**Crank-shaft bearings (hand-car).** 5, figs. 1724-6; 7, figs. 1720-23.

**Creamer automatic ventilator.** Figs. 1566-9. See *Ventilator*.

**Creamer lamp-fastening.** Fig. 847. A mode of attaching lamp-bottoms by what is in substance a clevis catch,

preventing the rotation of the lamp-bottom, and holding it fast by a spring at the side.

**Creamer safety-brake.** Figs. 263-5. A brake invented by William G. Creamer, of New York, now practically obsolete. It consists of an involute spring which is attached to and acts on the brake-shaft. This spring is contained in a case or drum 1, fig. 263. Before a train starts on a trip the spring is wound up and held in a state of tension by a pawl 6. In case of danger the pawl is disengaged by a lever 7, connected to the rod 8, which is operated by the bell-cord. By this means the locomotive runner, conductor, or brakeman can at any time apply all the brakes, or they will be applied by the separation of the train. It was never intended for use except in emergencies, and has been supplanted by *Air-brakes*, which see.

**Creamer solid-nipple seat-arm.** Fig. 1170. See *Seat-arm*.

**Crib-rail (English).** 64, figs. 116-119. A longitudinal piece of timber secured to the upper part of the outer side of the *sole-bar* and supporting the body of the vehicle.

**Cricket-iron.** A *Seat-stand*, which see.

**Crooked coupling-link.** Figs. 431-2, 441-2. See *Coupling-link*.

**Crooked end-piece (wooden truck frames).** 17, figs. 1944, 1947. An outside end piece hollowed out on top by cutting away the wood so as to clear the draw-timbers and drawbar fixtures.

**Cross-bar (Cowell coupler).** 5, fig. 538. A lever, fixed at one end and adjustable at the other end by the *adjusting-wedge* 6, operated by the *compression-lever* 16, which applies the tension to the *buffer springs* 14.

2. (Creamer brake, which see.) 2, figs. 263-4.

3. (Gouge heater.) Figs. 1422. The part on which the movable *grate* rests.

4. (Swing link-hanger.) 4, figs. 2110-1. The bar supporting the *cross-bar casting* which carries the *spring-plank*. Also called *mandrel-pin* and *lower swing-hanger* pivot.

**Cross-bar back-rest and front-rest (Gouge heater).** Figs. 1433, 1444. Parts fastened to the fixed grate to hold up the cross-bar.

**Cross bar casting, or spring-plank carrier (swing link-hanger).** 3, figs. 2110-1. See *Cross-bar*.



**Cross-bearer** (English). 3, figs. 116, 117; 204-206. American equivalent, *needle-beam* or *cross-frame tie-timber*, and sometimes *cross-bearer*. A transverse member of the *underframe*, placed between the ends of the vehicle. It serves to transfer the weight of the body and lading to the *sole-bars*, and keep the latter apart. Also called *cross-bar* or *transome*.

**Cross-frame king-post, or truss-block**. See *Cross-frame truss*.

**Cross-frame tie-bolt**. A *sill tie-rod*, which see. **A**<sup>8</sup>, fig. 122; 10, figs. 102-143; 9, figs. 155-85.

**Cross-frame tie-rods, or centre draw-rods** (Hoit draw-gear). 6, figs. 426-7. Two rods connecting the two cross-frame tie-timbers and serving the purpose of a continuous draw-rod by transmitting strains received from the draw-spring 3 and draw-rod 5.

**Cross-frame tie-timber, or needle-beam**. 22, figs. 82-91, 132-8; 26, figs. 155-85, etc. A transverse timber bolted to the under side of the longitudinal sills and floor timbers of a car-body between the bolsters, and to which the body king or queen-posts, or truss-blocks, are attached when truss-rods are used under a car-body.

The term *Needle-beam*, which see, taken from bridge engineering, seems to be in more general use than any other one name for this part, and being as short as any and exactly descriptive of the function performed by the stick, seems fairly to be entitled to preference. Other names are *body-transom*, *cross-bearer*, *cross berth*, etc.

**Cross-frame truss, or needle-beam truss**. Fig. 224. A truss for a needle-beam or cross-frame tie timber. For names of the various parts, *king-post*, *truss-rod*, *truss-rod washer*, etc., see engraving.

**Cross-frame truss-rod**. 3, fig. 224. See above.

**Cross-head** (Westinghouse driving-wheel brake). 6, fig. 322; 9, figs. 314-5; 6, fig. 354. A wrought-iron T-shaped head attached to the lower end of the piston-rod, and to which two *eccentric-lever links* are attached, to connect the piston-rod with the eccentric levers which work the brake-heads.

2. (Westinghouse brake.) 9, figs. 314-5; 3, figs. 324-5; 6, figs. 329, 331, etc. A forked casting attached to the outside end of a piston-rod, to which the brake levers are connected.

**Cross-pipe** (Gouge heater). Fig. 1436. A pipe to carry the hot air across the car underneath the floor.

**Crossman hand-car**. Fig. 1716. See *Hand-car*.

**Crown lamp-shade**. Fig. 947. See *Lamp-shade*.

**Cup**. 1. "A small vessel used commonly to drink out of, but the name is also given to vessels of like shape used for other purposes."—*Webster*.

See *Buffer-spring cup*. *Drain-cup*.

*Candle-holder cup*. *Oil-cup*.

*Side-bearing cup*.

2. (For water-bottom, Bissell heater.) Fig. 1384.

**Cupboard-catch, or flush-bolt**. Figs. 997-8, 1069, 1260. A very indefinite term for a light spring-catch nearly or quite flush with the surface to which it is attached. It has a beveled bolt, which snaps shut.

**Cupboard-latch**. Fig. 998. See above.

**Cup-holder, or tumbler-holder**. Figs. 1576-7. A stand or rack for holding a drinking-cup. See *Alcove cup-holder*.

**Cup-leather** (for piston-rod of Westinghouse driving-wheel brake-cylinder). 7, figs. 314-5. A substitute for ordinary gland packing.

**Cup side-bearing**. 61, figs. 1937-67. A side-bearing for trucks, with a receptacle for holding oil and waste. Little used.

**Cup-wash-r**. A *Socket washer*, which see.

**Curled hair**. Hair from the tails or manes of cattle, horses, etc., which is first spun into ropes, then wound into coils, and either steeped or boiled in water. After this the coil is dried and the hair unwound, which leaves it in a curly and elastic state, suited for stuffing cushions, etc.

**Curtain**. A cloth hanging in front of or around any space or object, as a window or sleeping-car berth, and which may be contracted or spread at will. The term, however, is usually restricted to loosely hung drapery, suspended on a *curtain-rod* by *curtain-hooks* or *rings*, in distinction from a *shade* which is flat and rolls up. Curtains in cars are chiefly used for sleeping-car berths (*Berth curtains*, which see), and for the sides of *summer street cars*, which see. *Window curtains*, which see, are little used. In ordinary passenger cars blinds are used instead, and in parlor and some passenger cars window shades are used.

**Curtain fixtures**. Figs. 1265-1274.

**Curtain brackets**. (Hartshorn and McKay, which see). Figs. 1684, 1690-2. One bracket has a circular hole and the other a rectangular.

Curtain-holder. See *Magnetic curtain-holder*.

Curtain-hooks (sleeping berths). Figs. 1266-8.

Curtain-rings. 32, figs. 694-5. Rarely used. See *Curtain*.

Curtain-rod. Fig. 1693; 30, fig. 694. (English.) 190, fig. 205. A bar to carry a curtain hung upon rings sliding freely along the rod.

Curtain-rod bracket (English). 192, fig. 205.

Curved seat-stop. Figs. 1180-1. See *Seat-stop*.

Cushion. Figs. 1205-23. Cushions used in passenger car upholstery are designated as *squab* cushions or *box* cushions, the latter being those built upon and connected with a wooden frame-work (*cushion-frame*), and the former a detached pad to be placed on a seat. Squab cushions are now rarely if ever used, but were formerly common. See *Seat-cushion*.

2. (Cowell coupler.) 23, fig. 538. See *Rubber cushion*. A platform buffer-spring.

Cushion back-rail (English). 151, figs. 205-6. In a carriage a small transverse bar which confines the hind end of the seat-cushion.

Cushion-frame. 17, fig. 1121; figs. 1205-23. A wooden frame to which the seat-springs and upholstery of a car-seat are attached.

Cushioning-blocks (for Thomas' steel-tired wheel). B, fig. 2175. Blocks of wood inserted under pressure in the *cushioning-pockets* of the *radial-arms*.

Cushion weather-strip. Fig. 1699. See *Weather-strip*.

Cuspidor. Figs. 809-11. A vessel to receive discharges of spittle, and having a wide rim so that if it is upset its contents will not be spilled. It is the modern substitute for a *spittoon*, fig. 808, from which it differs only in form.

Custom-house standard seal-lock. Fig. 1015.

Cut-off valve (Searle heater). C, figs. 1484-5. A valve for cutting off the water supply from the coil.

Cylinder. 1. A chamber or vessel whose ends are circular, and with straight parallel sides, as the cylinder of a steam-engine. The cylinders used in connection with cars and locomotives are made of cast-iron, and have pistons fitted so as to work air-tight in them. A variety of cylinders are used in brake apparatus, shown in figs. 264-369. Also see

*Air-cylinder.*  
*Brake-cylinder.*

*Reversing-cylinder.*  
*Steam-cylinder.*

2. A name sometimes given to the fire-pot of a stove or heater, as in fig. 1519.

3. (Ormsby sash-balance.) A, fig. 1703.

4. (Yale and Foster locks, which see.) Figs. 1026-28.

Cylinder-body (Westinghouse brake). 2, figs. 307-31. The main central portion closed by the *cylinder-heads*.

Cylinder brake-lever ("American" steam tender-brake.) 10, figs. 366-7. Same as the Westinghouse *cylinder-lever*, which see.

Cylinder-head. A metal cover for the end of a cylinder, held on by *cylinder-bolts* or *cylinder-studs*. The cylinder-head through which the piston passes is commonly termed the *back* cylinder-head and the other the *front* cylinder-head, corresponding to locomotive practice. In the Westinghouse air-pump and engine they are designated as *top* and *bottom* cylinder-heads. See *Cylinder*.

Cylinder-levers (Westinghouse brake). 7, fig. 325. Two levers which are connected together by a *tie-rod* attached near their centres. One end of one lever is attached to the cross-head of the brake-cylinder and the corresponding end of the other is attached to a bracket on the brake-cylinder head at the opposite end of the cylinder. The other ends of the levers are connected with the floating levers by rods.

Cylinder-lever bracket (Westinghouse brake). 4, fig. 325; 7, figs. 329, 331. A T-shaped piece of iron bolted to the front cylinder-head, to which one of the brake-levers is attached.

Cylinder-lever support (Westinghouse brake). 15, figs. 324-5. A wrought-iron bar bolted to one of the centre sills, on which the ends of the cylinder-levers rest.

Cylinder-lever tie-rod (Westinghouse brake). 14, fig. 325. See *Cylinder-lever*.

Cylinder release-cock (Westinghouse brake). 24, fig. 311. Also popularly called *bleeding-valve*. A cock attached to every car-brake cylinder for releasing the pressure on the piston from each car individually when the car is detached from the locomotive or the apparatus is out of order. This is called *bleeding* the brakes.

Cylindrical gauges. Gauges made for measuring the size of cylinders and cylindrical holes, often called Whitworth gauges. They consist of steel cylinders and rings hardened and ground very accurately to standard sizes. These fit into each other. The first is used for measur-



ing the size of holes and the last for measuring the outside of cylindrical objects, and they are called *internal* and *external cylindrical-gauges*. They are generally used as standards alone, from which other tools and gauges are made of the proper size.

**Cylindrical stove.** Fig. 1476. See *Stove*.

## D

**Damper.** See *Stove-pipe damper*. A valve for regulating the draft.

2. (Gouge heater.) Figs. 1405-7; also figs. 1434-56. Valves for regulating the air supply and draft. The *damper bushing*, *damper rod*, *knob* and *clips* are parts connected therewith.

**Damper-handle.** See *Stove-pipe damper-handle*.

**Danger signals.** Fig. 1043. A term, among a multitude of other evident meanings, used to designate white, red or green "blue lights" for burning from the rear of the train. They are carried in a signal-holder or igniter.

**Dash-guard** (street cars). **111**, figs. 1843-6. A plate attached to the platform railing to prevent mud or snow from being thrown upon the platform.

**Dash-guard straps.** **112**, fig. 1843. Small clips by which a dash-guard is fastened to the platform-posts.

**Day coach.** Figs. 154-190. A common term for an ordinary passenger car in distinction from sleeping cars. It ought in strictness to include parlor cars, but in general does not.

**Dayton safety berth-latch.** Figs. 1263-4. See *Safety berth-latch*.

**Dead-blocks.** Fig. 405. Two blocks of wood or iron attached to the end-sill or buffer-beam of a freight car. In contra-distinction to *buffer-block*, fig. 406, which is a single block in the middle of the end-sill, although the latter also is very commonly designated as a *single dead-block*. The present tendency is decidedly toward the use of two dead-blocks instead of one buffer-block.

Dead-blocks have been supposed to be so named because of their danger, but it is more probable that the name came simply from the fact that they are blocks which subserve no function in the construction of the car proper.

The M. C. B. standard dimensions, recommended at

the 16th Annual Convention, in Philadelphia, 1882, were amended in Saratoga, 1884, as follows (fig. 407):

Double dead-blocks are to be made 8 in. square on the face and 6 in. thick, and are to be placed 22 in. apart from centre to centre, and to have 14 in. space between them.

Single dead-blocks are to be not less than 30 in. long, 7 in. thick and 8 in. deep, measured vertically.

**Dead-centre.** "One of the two points in the orbit of a crank in which it is in line with the connecting rod."—*Knight*. To obviate the annoyance of having a dead-centre in hand-cars is one of the advantages claimed for the Crossman hand-car. Fig. 1716.

**Deadening, or deafening.** The filling placed between the floor and the *deafening-ceiling* to serve as a non-conductor to heat and noise. *Mineral wool*, which see, is sometimes used for deadening, but commonly shavings, when anything at all is used. An *intermediate floor* (between the sills) and *deafening-ceiling* (under the sills) is in modern car-building the more usual reliance, as in figs. 195-203.

**Dead-lever** (of brake-gear). **5**, figs. 338-9, etc. The one of a pair of levers to which the brake-shaft connecting-rod is *not* attached. The upper end of the dead-lever is confined within a *dead-lever guide*, which latter is provided with pins to adjust the end of the brake-lever as the brake-shoes wear. The lever to which the power is first applied is termed the *live lever*.

**Dead-lever guide, or brake-lever stop** (brake-gear). **2**, figs. 338-9. See above.

**Dead-lock.** Figs. 992, 1006-9. A lock in which the bolt is thrown each way by the key, and not in one direction by a spring, as with a spring-lock or night-latch.

**Dead-padlock.** A padlock in which neither the lock, bolt nor hasp has a spring, but the former is thrown each way by the key, and the hasp must be opened by the hand.

**Dead-plate** (Gouge heater). Fig. 1427. Lies on the bottom of the *mouth-piece*, fig. 1435, protecting the front brick lining.

**Dead-wood.** A *Dead-block* or *Buffer-block*, which see.

**Deafening-ceiling.** **28**, figs. 155-82. Boarding on the under side of the floor-timbers of a passenger car to exclude or deaden the noise of the car. See *Deadening*.

**Deafening-floor.** See *Deafening-ceiling*.

**Deck.** **102**, figs. 155-185, etc. A term applied to the roof

of a passenger car by analogy from the deck of a ship. The term is not applied in general use, however, to freight cars. The *deck* of passenger cars is subdivided into the *upper deck* (also called *clear-story*, which see) and *lower deck*, the roof at the side of the clear-story; but in designating parts which are not repeated in the upper and lower deck the term *deck* alone is used.

Since the issuing of the first edition of this work the use of the term *deck* instead of *clear-story* seems to have become practically universal among manufacturers of furnishings and in far more general use than any other among car-builders. The manufacturers and railroad officers consulted almost unanimously replied that they used no other term than *deck*.

**Deck beam.** A beam in the form of an inverted  $\perp$  with a round knob on the upper end, used in some forms of iron car construction. The Marden steel brake-beam, figs. 215-6, is a deck-beam.

**Deck bottom-rail.** 112, fig. 174; 57, figs. 1843-4. A horizontal timber running lengthwise of a car, fastened to the rafters or carlines of the main roof, or to the deck sill, which forms the base for the deck-posts.

**Deck bridging.** 2, 3, fig. 186. See *Bridging*.

**Deck carline, or upper deck carline.** 118, figs. 158-185; 60, figs. 1843-4. A timber which extends from side to side of the upper deck, and supports the roof boards. Corresponding parts in the lower deck are generally called *rafters*.

**Deck-collar** (Spear and other heaters). 6, figs. 1486-9. A sheet-metal ring to line the smoke-pipe opening through the roof, having a double sheet-metal tube to leave an air-space as a heat-guard, and a flange on the outside to exclude rain.

**Deck eaves-moulding, or upper-deck eaves-moulding.** 119, fig. 174. A moulding under the outside edge of the upper deck.

**Deck end-panel.** 116, figs. 158-185. It is frequently used as a ventilator.

**Deck end-sill.** 113, figs. 155-78. A horizontal timber connecting the ends of the deck-sills, and forming the base for the end of the upper deck.

**Deck end-ventilator.** See *Deck end-panel*.

**Deck end-ventilator hood** (street cars). 63, fig. 1843. A projecting screen, placed over the aperture of an end-ventilator to exclude snow and rain.

**Deck inside cornice.** 120, fig. 174. A moulding which

fills the interior angle where the upper deck joins the deck-side.

**Deck-plate.** 117, figs. 155-185; 4, fig. 186. A horizontal timber on top of the deck-posts or mullions to which the deck carlines are attached. Also called a *deck top-rail*.

**Deck-post.** 115, figs. 155-185; 58, figs. 1843-4. An upright piece of wood which connects the deck-plate with the bottom rail.

**Deck-sash.** 144, figs. 155-185; figs. 1632, etc. A glazed sash in the sides of the upper deck.

**Deck-sash catch.** Fig. 1627. A hook giving a simpler equivalent for a *deck-sash latch*.

**Deck-sash double-ratchet.** Fig. 1644. A special form of deck-sash pivot-plate, used with spring ratchets.

**Deck-sash flush-catch.** Figs. 1629. A *Deck-sash latch*, which see.

**Deck-sash latch.** Figs. 1627-36. A spring-bolt attached to a deck-sash, which engages with a deck-sash latch *keeper* or *strike-plate*. See *Keeper*.

**Deck-sash latch-keeper.** Figs. 1637, etc. See above.

**Deck-sash lintel.** 5, fig. 186. See *Lintel*.

**Deck-sash opener.** Figs. 1603-1626. A lever attached to a revolving rod by which a deck-sash is held in any desired position. A great variety of forms exist, including many patented devices. See engravings. A *pull-hook*, fig. 1556, is sometimes called a deck-sash opener, but a more elaborate contrivance is generally meant.

**Deck-sash pivot.** Figs. 1611-13, 1863, and generally 1614-65. A metal stud or spindle attached to a suitable flange by which it is fastened to a deck-sash, and on which the latter turns. A great variety of forms exist, including several patented devices, as Hart's, Monitor, Morgan's, etc., to render the sash readily removable and adjustable.

**Deck-sash pivot bushing.** Same as fig. 1654. See *Bushing*.

**Deck-sash pivot-plate.** Figs. 1612, 1864. A plate attached to the window-casing, with a hole or eye in which a deck-sash pivot works. Sometimes they are provided with springs to prevent the sash from rattling.

Deck-sash post, 6, fig. 186, should read *Deck-post*, which see.

**Deck-sash pull.** Figs. 1634-6. A screw-ring attached to a deck-sash to open and close it. Made either *with screw* or *with flange*.



**Deck-sash quadrant.** 2, fig. 1638. A curved bar or plate of metal used as a guide or stop to control the movement of a deck-sash. Little used.

**Deck-sash quadrant clip.** 1, fig. 1638. A guide-strap embracing a deck-sash quadrant.

**Deck-sash ratchet-plate.** Figs. 1620, 1622, 1632-3, 1640-4. A part usually attached to the side of the car, but sometimes to the sash carrying a *ratchet* in which the ratchet-catch engages.

**Deck-sash socket.** Fig. 1631. A hook attached to a peculiar form of deck-sash pivot. See engravings.

**Deck-sash spring pivot.** Fig. 1642. A deck-sash pivot, which see, provided with a spring to make the sash removable.

**Deck side.** The entire part, consisting of a plate, rail, posts and panels, or sashes, which forms the side which occupies the vertical space between the lower and upper deck.

**Deck side-ventilator.** 143, fig. 155; figs. 1556-7. This term is also used to designate the door or valves and their attachments for opening and closing the aperture.

**Deck-sill.** 111, figs. 155-185. A horizontal timber attached to the inner ends of the rafters, or short carlines, on which the deck side rests.

**Deck-sill facing.** 114, figs. 174, etc. Thin boards or mouldings attached to the inside of a deck-sill, for ornament.

**Deck soffit-board.** 121, figs. 174, etc. A board on the under side of the overhanging cornice of an upper deck.

**Deck top-rail.** 117, figs. 155-185. A *Deck-plate*, which see.

**Deck-ventilator.** See *Deck end-ventilator*. *Deck side-ventilator*. The deck-sashes are the usual side-ventilators.

**Deflecting orifice** (Gouge heater). Fig. 1408. An opening in the hot-air pipe at the opposite end of the car from the heater, which has a slope downward so as to cause the hot air to strike the floor.

**Deflector.** 1. (For windows.) A piece of thin board to be inserted below the window and left projecting two or three inches beyond and at right angles to the car. When the car is in motion it produces an exhaust draft. A permanent attachment between the windows, with beveled faces, has recently been introduced.

2. (Gouge heater.) Figs. 1414-47. Openings near the stove for the discharge of hot air, the outlet being opened or closed by a valve in the *deflector-pipe*, fig. 1414. When the car is at rest it is warmed by opening the *deflector-*

*valve*, fig. 1409, which is held shut by the *ball and chain* 51, and by the pressure of the air on the inside of the case, thus allowing the hot air to flow out under the deflector, fig. 1447, through the *deflector-valve frame* 37, both these parts being fastened into the *deflector-end of case* 82, fig. 1409.

3. (Searle heater.) **D**, figs. 1484-5. A thin curved plate in the tee-joint between the *outflow-pipe* and the *delivery-pipe* used to cause a current of air to flow regularly between the pipes and not produce much pressure in the expansion-drum on the roof.

4. (Of ventilators, which see.) **D**, figs. 1564-8; 1, fig. 1569.

**Deflector-springs** (of ventilators). **A**, figs. 1566-8. Springs controlling the movement of the deflectors.

**Deflector-valve frame** (Gouge heater). Fig. 1442. See above.

**Delivery-pipe** (Searle heater). Figs. 1484-5. The pipe connected to the outflow-pipe by a tee-joint, through which the hot air passes to the radiators under the seats. The other end of the tee-joint connects with the expansion-drum on the roof.

**Delivery-pipe** (suspended heater). **G**, figs. 1529-32. Generally called the *hot-air pipe* in other heaters.

**Derrick.** Figs. 151-3. "A form of hoisting machine. The peculiar feature of a derrick, which distinguishes it from other forms of hoisting machines, is that it has a *boom* stayed with a central post" (termed the *mast*), "which may be anchored, but is usually stayed by *guys*."

"A *derrick* has one leg, a *shears* two, and a *gin* three. A *crane* has a post and a *jib*," and is a *rigid* machine, not having a movable boom. "A *whin* or *whim* has a vertical axis on which a rope winds. The *capstan* has a vertical drum for a rope, and is rotated by *bars*. The *windlass* has a horizontal barrel, and is rotated by *handspikes*. The *winch* has a horizontal barrel, and is frequently the means of winding up the tackle-rope of a derrick; it is rotated by *cranks*. The *crab* is a portable winch and has cranks.

"The derrick is more commonly used in the United States than in Europe, and has attained what appears to be maximum effectiveness with a given weight. Two spars, three guys and two sets of tackle—one for the jib and one for the load—complete the apparatus, except the winch, crab, or capstan, for hoisting.

“The invention is nautical, the original being the sailor’s contrivance, made of a spare topmast or a boom, and the appropriate tackle. Such are used in masting, putting in boilers and engines, and hoisting heavy merchandise on board or ashore.

“The *derrick-crane* is a combination of the two devices, as its name imports, having facility for hoisting and also for swinging the load horizontally.”—*Knight*.

**Derrick-car.** Figs. 73, 75-80, 144, 153. A strong platform car which carries a derrick, which is used for removing wrecked cars and engines, erecting bridges, or handling any heavy objects. Also called *wrecking-car*. They are distinguished as *hand* or *steam* derrick cars, according to the power used.

**Derrick truss-rod.** 19, figs. 77-78. A rod attached to the side-sills of a derrick car at each end and passing under the *mast-pocket* or other equivalent compression-block, constituting a truss to resist the pressure of the derrick.

**Destination-board bracket (English).** 183, fig. 205. A small shelf of cast or wrought iron secured to the upper part of the outside of the body, in order to carry a wooden board or enameled metal plate, giving the destination of a train. It is universally used on all English carriages, and carried throughout the entire trip.

**Destination-card and rack (freight cars).** Figs. 1048-9; 80, fig. 43. A convenience in increasing use, but usually conspicuous by its absence.

**Detachable globe-holder.** 7, figs. 868, etc. A globe-holder arranged so that a lamp-globe can readily be attached or removed. Many lamps have the globes fixed or *plastered*. Hence, often called *plaster-lamps*.

**Detaching-slot (of deck-sash ratchet).** B, figs. 1622-3. A slot in the ratchet-plate to facilitate removal of the sash.

**Detective wire (for seals).** Fig. 1117. A flat twisted wire or other equivalent device to prevent the seal being stripped from the wire without destroying one or both.

**Detent-latch (Ormsby sash-balance).** Figs. 1703-6. A device for holding the spring fixed at the desired tension when the sash balance is removed, and hence not loaded by the sash so as to balance its tension.

**Diagonal (English).** 4, figs. 117 and 206. American equivalent (used chiefly in street cars), *diagonal floor-timber*. A member of the underframe. One end butts

against the rear side of the transverse end member of the underframe (the *headstock*), and the other end butts against an intermediate transverse member of the underframe (the *cross-bearer*), near its centre. The *diagonal* takes the strain of the side-buffer, and distributes it so as to prevent distortion of the *underframe*.

**Diagonal floor-timbers.** 1, fig. 648. Floor-timbers which are placed in an inclined position to the sills. Used chiefly on street cars.

**Diagonal roof-strap (street cars).** A band of hoop-iron placed diagonally on the top of the roof-boards to stiffen the roof.

**Diameter testing-gauge (for car-wheels).** Fig. 2122. One of the M. C. B. standard gauges for testing wheels and axles.

**Diamond-truck.** Figs. 1907-40. A car-truck with iron side-frames consisting of two or more *arch-bars*, which see, and a *pedestal tie-bar*. The spaces between the arch-bars are diamond-shaped, whence the name. The journal-boxes are rigidly bolted to the sides. The cross-members of the truck, bolster spring-plank, etc., are still usually of wood, but, by increasing usage, of iron.

This form, it was voted, at the last Master Car-Builders’ Convention (1884) should be the type used in preparing designs for a standard freight-car truck, to have also a 5 ft. wheel-base, channel-bar transoms, and either *swing* or *rigid bolster*, which see. It is already the type in almost universal use for freight cars. See *Truck*.

The *California* or *Allen truck* is an exceptional form of diamond-truck having a journal-spring, as in fig. 1959.

**Diaphragm.** 1. (Eames vacuum brake.) 1, figs. 268-73. An equivalent for the Westinghouse *brake-cylinder*, serving to operate the brakes. It consists of a cast-iron bowl-shaped *shell*, to which the *diaphragm-rubber* is attached by *diaphragm-rings*. A rubber *diaphragm-hose* connects it to the brake-pipe. Three sizes of diaphragms are manufactured: No. 4, for narrow-gauge cars, No. 3 for standard-gauge cars, and No. 2½ for heavy driver-brakes.

2. (Pintsch gas pressure-regulator.) Fig. 813.

3. (Refrigerator car.) D, fig. 131. See *Condensing diaphragm*.

4. (Westinghouse brake and train-signal apparatus.) A considerable number of the various valves are regulated



by *diaphragms* or *diaphragm-plates*, to which are attached springs, nuts, stems, etc., etc., whose names explain themselves. See engravings of Westinghouse apparatus, figs. 293-357, 687-691. These diaphragms all operate on the same principle. They are spring-plates which cause the attached valves to seat or unseat at a fixed pressure.

**Differential car-door hanger.** Figs. 798-801. See *Car-door hanger*.

**Dining car.** Figs. 56, 191-4, 214. A car provided with a kitchen and cooking appliances and arrangements for serving meals as in a hotel. *Hotel-cars* also have similar arrangements on a smaller scale, but they are mainly given up to sleeping berths.

The first dining-cars were probably those run on the Philadelphia, Wilmington & Baltimore road in 1863-5, but these cars had no arrangements for cooking, receiving cooked provisions at the end of each run. The more modern cars had nearly all their cooking done on the car itself, and alone among the more luxurious classes of cars were generally run by the companies themselves and at a slight pecuniary loss, with the object of attracting travel. They are in wide and increasing use.

**Dining-car range.** Fig. 1481. See *Range*.

**Dinsmore spiral-spring.** Figs. 2065-6. A spiral-spring, patented by C. Dinsmore, 1862-63-71, formed of a bar of section resembling a figure 8, wound edgewise on a mandrel to form the coil. They are now little used.

**Directors'-car range.** Fig. 1482. See *Range*.

**Discharge-cock** (Winslow heater). C, fig. 1534; D, fig. 1536. A cock for emptying the *safety-tank*.

**Discharge-pipe** (air-pump for Westinghouse brake, also called *reservoir pipe*). 9, 9, fig. 297; 35, figs. 293-4. A pipe by which the compressed air is conveyed from the air-pump to the main air-reservoir.

**Discharge valve.** 1. (Of car signal-valve, Westinghouse train signal apparatus.) 4, figs. 688-9. The valve in the attachment called the *car signal-valve*. The whole device is also sometimes so called.

2. (Of air-pump for Westinghouse brake.) 30-33, figs. 298-9. The valve through which the air as compressed passes to the main reservoir. There are two—*upper* and *lower*. See also *Auxiliary discharge-valve*.

**Discharge valve-seat wrench** (Westinghouse brake). 32, fig. 311. See *Wrench*.

**Disengaging bolt** (Howard's parlor-car water-closet). Figs. 1087-89. An attachment by which the water-supply valve and the pan are disconnected from the bowl proper, so that the closet can be used as a plain hopper in case the water supply gives out.

**Distance-block.** A short, thick piece of wood placed between two or more objects to keep them apart, or to preserve an interval of space between them, as *floor-timber distance-block*, *truck-bolster distance-block*, etc.

**Distance-gauge** (between backs of wheel-flanges). Fig. 1996. One of the M. C. B. standard wheel and axle gauges.

**Distance-piece.** 2, figs. 452, etc. A metallic *distance-block*. See *Draubar distance-piece*.

**Ditching-car.** Fig. 71. A car provided with derricks and scoops for excavating the ditches of cuts by the power of a locomotive. The contrivance is a patent controlled by the American Ditching Co., of La Crosse, Wis.

**Dividing attachment** (Eames, for engines fitted with drum-brakes). Figs. 274-5. A device to regulate the application of the brakes to either the locomotive or train, or both.

**Dog.** 1. A general term in mechanics for all devices which bite or take hold of or give motion to other parts, See *Ratchet-dog*.

2. (For pawl of winding-shaft.) 6, fig. 109; 132, fig. 105. A disk or button eccentrically pivoted in such a way as to hold the *ratchet-wheel pawl* of a winding-shaft in its place. The pawl itself of a ratchet-gear is also sometimes termed the dog in other forms of ratchet-gear where no dog to hold the pawl is necessary.

3. 5, figs. 252-4. A *Brake-pawl dog*, which see. A very similar part to that defined above.

**Dome.** 1. A *clear-story* or *upper deck* is sometimes erroneously called a dome. See also *Tank-dome*.

2. (Winslow heater.) G, fig. 1536. The top to the fire-pot. See also *Water-bottom dome* (Bissell heater), fig. 1385.

**Dome-head** (tank car). 109, figs. 139-42. The top of the dome.

"**Dome**" lamp-shade. Fig. 945. A *Lamp-shade*, which see, of curved or *ogee* outline.

**Door.** Figs. 370-87, etc. A frame of boards for closing a doorway. See *Door-frame* for names of parts. See also *Ash-pit door*. *Grated-door*.

<i>Clinker-door.</i>	<i>Lamp-case door.</i>
<i>Double-door.</i>	<i>Overhung-door.</i>
<i>Double fire-door.</i>	<i>Platform trap-door.</i>
<i>Draft-door.</i>	<i>Shaker-door.</i>
<i>Dust-door.</i>	<i>Sliding-door.</i>
<i>Dust hand-hole door.</i>	<i>Smoke-box door.</i>
<i>Fare wicket-door.</i>	<i>Sub-door.</i>
<i>Feed-door.</i>	<i>Tip-car door.</i>
<i>Fire-door.</i>	<i>Underhung-door.</i>
<i>Grain-door.</i>	<i>Ventilator-door.</i>

**Door-apron** (street cars). 1, fig. 1842. A sheet-iron cover attached to a swinging door to inclose the step.

**Door-bolt.** Figs. 758-61, 1081-3. A metal bar attached to a slide and fastened to a door so as to hold it shut from the inside. They are either *round*, or *barrel*, or *square*. A *square-neck* door-bolt is one with an angle or shoulder in it. *Flush* door-bolts are gained in so as to be flush with the surface. A *cupboard-catch* is a form of door-bolt having a beveled latch and actuated by a spring, but bolts so formed are commonly termed *Latches*, which see.

**Door-bolt keeper.** Fig. 760. A catch attached to a door-frame, in which the bolt engages.

**Door bottom-rail.** 114, figs. 204-205. See *Door-frame*.

**Door bottom ventilator-rail** (English). 112, figs. 204-205. A piece of wood running horizontally and supporting a sliding ventilator.

**Door-brace** (freight-car doors). 69, figs. 89, 132. A diagonal piece of timber framed to stiffen the door.

**Door-butt.** A *Butt-hinge*, which see.

**Door-button.** Figs. 751, 754. "A small piece of wood or metal swiveled by a screw through the middle, and used as a fastening for a door or gate."—*Knight*. They are often attached by a rivet or pin to a metal *door button-plate*, which is fastened on with screws. Sometimes the button is an eccentric disk.

**Door-cap** (freight-car doors). 177, figs. 93-6. A horizontal board across the top of the door.

**Door-case.** 1. The frame which incloses or surrounds the sides and top of a door. The separate parts are the *door-jambs*, or *door-posts*, *door-sill* and *door-lintel*, which see.

2. A partition at the end of a street-car which incloses a sliding door when open. See *Fare-wicket door-case*.

**Door-case intermediate rail** (street cars). 84, fig. 1844. A rail of a door-case above the window.

**Door-case panel** (street cars). Figs. 1843-6. A panel in a partition which incloses the sliding-door. There are two, the top-panel and seat-panel.

**Door-case sash** (street cars). 86, fig. 1844. A window-sash in the partition which incloses a sliding-door. It opens on hinges and is placed opposite to another in the end of the car outside of the door.

**Door-case sash-button.** 87, fig. 1844; fig. 1861. See *Door-button*.

**Door-case seat-panel.** 43, fig. 1844. See *Door-case panel*.

**Door-case top-panel.** 85, fig. 1844. See *Door-case panel*. In some cases a mirror is used in place of a panel.

**Door-case top-rail.** 83, fig. 1844. A stick parallel with the *Door-lintel*, which see.

**Door centre-girth** (freight-car doors). 178, figs. 93-6. A horizontal board across the middle of the door. A *middle door-rail*, except that it is not framed into the door but simply nailed on.

**Door fence-rail** (English). 118, figs. 204, 205. A horizontal piece of wood forming, on the outside of the door, the bottom of the window aperture. It is reinforced with a band of brass or iron against which the window sash bears when it is closed.

English carriage windows drop down to open, like an omnibus or street car window.

**Door-frame.** Fig. 370. The structure in which the panels of a door are fitted. It is composed, as is also a window sash, of the *stiles*, or upright pieces at the sides; the *mullions*, or central upright pieces; the *bottom-rail*; the *lock*, or *central rail*, and the *top-rail*. The *Door-case*, which see, surrounds it. See *Fire-door frame*.

**Door friction-roller.** Figs. 791-801, etc. See *Sliding-door friction-roller*. *Car-door hanger*.

**Door glass-frame stop-rail** (English). 115, figs. 204-5. In a carriage, a small horizontal piece of wood in the lower part of the door against which the window drops when opened. See *Door fence-rail*.

**Door-guards** (baggage and freight-car sliding doors). 77, figs. 83-5. Strips of wood which inclose the space occupied by the door to keep the freight from interfering with its movement.

**Door guard-band** (street cars). 88, fig. 1845. A metal band fastened crosswise on the middle door-rail to protect the door from being chafed.

**Door-handle** (freight cars). 78, figs. 82-96. A U-shaped



wrought-iron bar attached to the door, sometimes horizontally and sometimes vertically. A *Sliding door-handle*, which see, is for passenger cars.

2. (English.) 181, figs. 204-5. Serves the purpose of an American *door-knob*. An L-shaped brass bar attached to the outer end of a door-spindle, and conveniently shaped to be grasped by the hand, so that the door can be opened by a person either inside or outside the carriage.

**Door hand-rail** (street cars). 2, fig. 1842. A rail attached to the inside of a swinging-door for passengers to take hold of in getting on and off the car.

**Door-hanger**. 68, figs. 87-138. A hook-shaped piece of metal by which a sliding-door is suspended at its top, and which slides on an iron track at the top of the door. For freight cars they are usually made of wrought-iron, but sometimes of cast-iron, with friction rollers, or sheaves, on which the door rolls. They are also used in sleeping and drawing-room cars, and are then generally made of brass and plated. The name of these more elaborate forms is commonly extended into *Car-door hanger*, which see. See also *Anti-friction car-door hanger*.

**Door-hasp**. 73, fig. 82; I, fig. 1011. A metal clasp attached to car-doors, by which they are fastened to a staple on the body of the car. Used chiefly on freight-car doors secured with padlocks.

**Door-hasp pin** (seal-lock). H, fig. 1011. A projecting lug on which a carefully shaped door-hasp enters, and is secured in place by the *clasp*.

**Door-hinge**. 16, figs. 370, 779, 790, 784. See *Hinge*.

2. (English.) 178, fig. 205. Three brass hinges, upper, middle and lower, securing the door to the body. These hinges generally differ slightly to allow for the curvature or *fall under* of the door.

**Door-holder**. Figs. 762-78. A device for holding a door open or shut. Common forms are shown in figs. 762-4, and 768-71. Door-holders are often called *door-stops*, but the latter is properly a mere padded peg, intended only to check momentum of the door when too violently opened. See *Barnard door-holder*. *Lamp-case door-holder*. *Sliding-door holder*.

**Door-holder catch, or door-holder stop**. Figs. 763-4. A metal bracket attached to the floor (*floor-stop*) or side

(*partition-stop*) of a car, with which a *door-holder* engages, to hold a door open.

**Door-hook** (street cars). Figs. 773-5, 1852-3. A *Sliding-door holder*, which see.

**Door-jamb**. 1, fig. 370. The side piece or post of a door-case. Also called *door-post*. Not to be confused with the *stiles* of the door itself.

**Door-knob**. 17, fig. 370; 5, figs. 994-999, 1005-25. A ball attached to the end of the *spindle* of a door-latch to take hold of in moving the latch or opening the door. The knob is often made in various peculiar forms, as *T door-knob*. fig. 750.

**Door-latch**. Figs. 989-95, 1005-10, 1022-4. An attachment to a door to hold it shut. See *Latch*. A door-latch is often made in combination with a lock, having a separate bolt and key to secure or fasten the door from the outside, as in figs. 987, etc.

**Door-latch arbor**. A *Door-latch spindle*, which see.

**Door-latch bolt**. 1, figs. 987-95, 1005-24. See *Latch*.

**Door-latch hook**. 2, figs. 746-9, 990-1. The part of a *sliding-door latch* which engages with the keeper and holds the door shut.

**Door-latch keeper**. 9, figs. 746-9, 989-90, 1022-4. Also called *Strike-plate*, which see.

**Door-latch rose, or escutcheon**. 4, figs. 750, 987-99, 1002-5. A plate fastened to a door as a guard or bearing for the spindle. See *Escutcheon*.

**Door-latch spindle**. 10, fig. 994; 750, etc. A small metal shaft to which the door-handle or knob is attached, and by which the latch is turned.

**Door-latch spring**. A spring which acts on the latch-hook or bolt and causes it to engage with its keeper; usually made of a flat piece of cast-steel.

**Door-light** (English). 138, figs. 204, 206. In a carriage, the window in the door which in English carriages is lowered to open it like an omnibus or street-car window.

**Door-light bottom sash-rail, or glass-frame bottom sash-rail** (English). 140, figs. 204-5. The bottom part of the door window framing.

**Door-light stile, or glass frame stile** (English). 141, fig. 205. The upright members of the window framing.

**Door-lintel**. 99, figs. 158-85; 18, fig. 370. The horizontal part of a door-casing above the door. It is usually of wood, but in passenger-cars it is sometimes made of a thin shell of cast-iron. See *Door-frame*.

**Door-lock.** 19, fig. 370; figs. 746-9, 987-95, 1005-24. See *Lock*. A *latch*, which see, is usually combined with a passenger car door-lock.

**Door-lock bolt.** 7, fig. 991. See *Lock*.

**Door-lock keeper, or nosing.** 8, figs. 987-94. See *Keeper*.

**Door-mullion.** 146, figs. 158-85; 2, fig. 370; 79, fig. 1845.

A vertical bar of wood between the panels of a door. See *Door-frame*. *Door-window mullion*.

**Door name-plate.** 3, fig. 370. A metal plate on the inside of a passenger-car door with the name of the builder inscribed on it. This is now more commonly painted on.

**Door-panel.** 151, figs. 158, 185; 10 and 11, fig. 370. "A piece of board whose edges are inserted into the groove of a thicker surrounding frame of a door."—*Webster*. They are distinguished as *lower*, *middle* and *upper*. Any panel, but especially the lower, is sometimes cut up into two *twin panels* by a *door mullion*.

**Door-panel batten (English).** 109, fig. 205. American equivalent, *furring*. In a carriage, a piece which stiffens the *door-panel*, which is pinned to it.

**Door-pillar or door-stile (English).** 139, figs. 204, 206. American equivalent, *door-stile*, which see. The outer sides of the stiles are beveled in a peculiar manner, so as to shut tight, and the inner sides are grooved to allow the movement of the window.

**Door-pin (freight-car doors).** 74, figs. 82, 87, 93. A pin used to fasten a *hasp* on to a *staple*. Lead seals are sometimes attached thereto.

**Door-pin chain.** 75, fig. 82. A chain by which a door-pin is attached to a car.

**Door-plate.** 3, fig. 370; figs. 1099 etc. A notice-plate. See *Door name-plate*.

**Door-post, or door-jamb.** 44, figs. 82-143; 62, figs. 155-85; 1, fig. 370; 18, figs. 1843-4. A vertical post which forms the side of a doorway.

**Door-post filling-piece (passenger car framing).** 35, fig. 186.

**Door-post pocket.** 44, figs. 82-101. See *Pocket*.

**Door-pull.** Figs. 752-3. A D-shaped handle attached to a door to take hold of in opening or closing it.

**Door-rail.** Fig. 370. A horizontal member or bar of the framing of a door. The upper one, 4, fig. 370, is called the *top-rail*; the lower one, 5, the *bottom-rail*; 6, the *middle* or *lock-rail*; 7, the *parting-rail*. Minor variations often occur.

**Door-rail bracket (passenger car doors).** 1, figs. 371-2. A bracket to carry top door-rail, serving as a guide for the door. See also *Door-truck bracket*.

**Door-roller.** A *Door-sheave*, which see.

**Door-sash.** 12 and 13, fig. 370. A wooden frame, containing one or more panes of glass, placed in a door. In some cases one of these sashes is made to slide, so that it can be opened for ventilation. They are distinguished as *lower* and *upper* door-sash. The lower sash is commonly movable for ventilation and held open by a *door sash-lift* or *bolt* entering into a *door-sash plate*.

**Door-sash bolt.** 14, fig. 370; fig. 766. A metal pin attached to a sliding-door sash to hold it in any desired position.

**Door-sash lift.** Figs. 1669-70. See also above.

**Door-sash plate.** Fig. 767; 15, fig. 370. See above.

**Door-shaft (single-platform street cars).** An iron shaft extending through the car for the purpose of enabling the driver to open the rear door. A *door-shaft lever* is attached at the front end and a *door-shaft crank* at the back end, which is fastened to a slotted *door-shaft crank plate* on the door.

**Door-sheave, or sliding-door sheave.** 2, figs. 291-6. A small wheel on which a sliding door rolls. It is placed at the bottom of the door and sometimes at the top, also. It is carried in a *door-sheave holder*. A grooved casting called a *door-shoe* or *door-slide* is sometimes used as a substitute on freight car doors, especially when the load does not rest upon the lower door-track.

**Door-shoe.** 70, fig. 82. See *Door-sheave*.

**Door-sill.** 64, figs. 88-9, 93-4; 93, figs. 1843-4. A cross-piece attached to the floor on the under side of a door-opening. In car construction the term is usually applied to an iron plate used under passenger-car and occasionally freight-car doors, as 5, fig. 379.

**Door-sill plate (English).** 208, figs. 204, 205. American equivalent, *door-sill* or *door-sill plate*. A roughened brass wearing piece placed in the doorway entrance.

**Door-slide.** See *Door-sheave*.

**Door-spindle.** Figs. 999, 1003-10. The bar passing through the door which carries the door-knobs.

**Door-spring.** Figs. 755-7. An attachment to make doors self-closing. Three of the great numbers of devices in use are shown. They are little used in car-work, *double*



*action spring hinges*, figs. 785-8, being in general used instead for the few doors requiring them.

**Door-stile.** 150, figs. 158-85; 8, fig. 370; 78, fig. 1845. One of the two upright pieces on the outer edges of a *door-frame*, which see.

**Door-stop.** Fig. 772. 1. A peg or block against which a passenger-car door strikes when opened, often provided with a rubber cushion, especially for swinging-doors. *Door-holders*, which both stop the door and retain it, are often called *door-stop*, as figs. 768-71.

2. (Freight-car sliding-doors.) 71, 72, figs. 82-93, etc. Blocks or strips of wood or (usually) iron to restrain excessive motion. They are distinguished as *closed door-stop* and *open door-stop*.

**Door-strap** (street cars). A leather strap or cord by which the back-door is opened and shut from the front platform. See *Door-shaft*.

**Door top-rail.** 113, figs. 204, 205, etc. See *Door-rail*.

**Door-track.** 65, 66, figs. 87-138. A metal bar or guide which supports a sliding-door, and upon which it moves, or by which it is held in its place. They are either *top door-tracks* or *bottom door-tracks*. The former usually carry the weight of freight-car doors, being hung thereon by *door-hangers*. The lower track serves only as a guide for the *door-shoes*.

**Door-track bracket.** 67, figs. 82-91, 132-38. An iron or wooden block, fastened to the side of a freight-car, to which a door-track is attached or which holds a sliding-door in its place. See also *Door-rail bracket*.

**Door-way.** The passage or opening formed by a *door-case*, which is closed by a door.

**Door-window mullion.** 80, fig. 1845. A middle upright bar. See *Door-frame*.

**Dope.** Any mixed grease which is not fluid, used for lubricating.

**Double-acting spring hinge.** Figs. 785-8. A device to permit a door to open either way and also to make it self-closing. They are from  $2\frac{1}{2}$  to 7 in. in length of flange, 4 in. being the most usual. They consist in their original form of a hinge on a hinge, the two opening in opposite directions. The "Utility" double-acting hinge is much like an ordinary butt hinge, the tendency to restore the door to its normal position when opened in either direction being caused by a spring.

**Double-board roof.** Fig. 666. See *Car-roof*. The upper

layer of grooved boards are sometimes laid with the grooves under so as to form a kind of tube between the two layers.

**Double brace-pocket.** 41, figs. 132-8, etc. See *Pocket*.

**Double chair** (Hartley, which see). Fig. 1155. A special form of the Hartley chair combined in pairs to save room. They are mainly intended to be used for seats three abreast, a single chair being used on the opposite side of the car.

**Double check-valve** (Westinghouse brake). 29, figs. 311, 313. A valve, now little used, attached to the pipes underneath a car, which is equipped with both the old style *straight-air* (which see) and the automatic brake, so that either can be used. See *Triple-valve with double-check* (also little used). Figs. 356-7.

**Double-coil nest spring.** Figs. 2049-2106. A *Spiral-spring*, which see, with another inside of it.

**Double-cone lamp-globe.** Fig. 953. See *Lamp-globe*.

**Double-deck stock-car.** Figs. 132-8. One with two floors, or stories, one above the other, for carrying sheep, hogs, etc. The intermediate floor is called the *upper floor* or *double deck*.

**Double-deck street-car.** Fig. 1838. A street-car with seats on the roof, much used abroad but rarely in the U. S.

**Double-door.** 1. A door made in two parts. These are sometimes fastened together by hinges, so as to fold back on each other, and sometimes each part is hinged to one of the door-posts. Such doors are used for mail, baggage and postal cars. Sliding-doors are also sometimes made in two parts.

2. (Fruit car). Figs. 121-125, 130, etc. Doors in pairs, one inside the other, as in refrigerator cars, etc., are also called double-doors.

**Double elliptic spring.** Fig. 2034. See *Elliptic spring*.

**Double fire-door** (Spear heater). Fig. 1528d. See *Fire-door*.

**Double-guard** (lanterns). Fig. 980. See *Guard*.

**Double iron body-bolster.** Figs. 219-20, 199-203, 1971-3.

A common form for passenger cars with six-wheel trucks, composed of two parallel iron trusses connected by iron plates or bars.

**Double-lens tail or signal-lamp.** Figs. 956, etc. A lamp with two lenses on opposite sides. See *Signal-light*.

**Double-lever brake.** Fig. 231. A brake which has two levers to a truck. The object of using two levers is to

- equalize the pressure on the two brake-beams. See *Brake-gear*.
- Double pipe-clip.** Fig. 1345. An iron band made with two bends for holding two pipes (as heater pipes) in their place. See *Clip*.
- Double-plate wheel.** Figs. 2135-6. A cast-iron car-wheel, the rim and hub of which are united by two cast-iron plates or disks. See *Car-wheel* and *wheel*.
- Double ratchet** (Morgan's deck-sash pivot). Figs. 1618-21. A pair of ribbed disks which engage with each other in any position, there being no separate dog or ratchet-bolt. Another style of double ratchet, so called from its working when the sash is moved either way, is shown in figs. 1640-4.
- Double sash-spring.** Fig. 1648. See *Sash-spring*.
- Double-spoke car-wheel.** Figs. 2162 and 2165. See *Kirtley's double-spoke car-wheel*.
- Double strap hanger** (for bell-cord). Fig. 737. See *Bell-cord hanger*.
- Double-spring drawbar.** Figs. 424-7. A form of drawbar in which two springs are used, either side by side, as in some designs not here shown, or one in front of the other, as in the Hoit draw-gear, figs. 426-7. In the latter case only one of the springs acts at once, one under tension and the other under compression. Drawbars with *auxiliary draw-springs*, which see, figs. 387-90, are still another class, which are double spring *de facto*, but not so called.
- Double-spring drawbar timber** (Hoit draw-gear). 2, figs. 426-7. Two timbers extending longitudinally from the needle-beams to the *follower plate-block*, bolted to and under the centre-sills and connected thereto with *packing-blocks*.
- Double-washer.** Figs. 1778, 1875. Also called a *twin-washer*.
- Double window-blind.** 140, figs. 155-85; 17, 18, figs. 692-3, 679-81, which see. The usual form of window-blind. They are made in two parts, so as to require less height when raised. See *Window-blind*.
- Double window-blind lift.** Figs. 1675, 1685, 1689-92. See *Window-blind lift*.
- Dove-tail.** "A flaring tenon adapted to fit into a mortise having receding sides so as to prevent the withdrawal of the tenon in the directions to which it will be exposed to strain."—*Knight*. Fig. 1977 shows one of the many forms of dove-tail joints, but it is not exactly similar to such joints in wood.
- Draft-bolt** (Janney coupler, which see). 11, figs. 542-554, 555-601.
- Draft-door** (Gouge heater). 22-3, fig. 1408½. Same as an *ash-pit door* of other heaters. Has catch, slide-bolt, etc.
- Draft-iron** (Janney coupler, which see). 112, figs. 542-54. The equivalent of a *drawbar jaw*, which see.
- Draft regulator.** Figs. 1491-2. See *Spear's draft regulator*.
- Draft-sills.** The *centre-sills*.
- Draft-spring.** A *Draw-spring*, which see.
- Draft-valve** (Harrison postal-car chandelier). E, figs. 841-2.
- Draft-washer** (Janney coupler). 31, figs. 542-554, 555-601. The washer for the rear end of the auxiliary draft-spring.
- Drain-cock.** 1. (Of engine, Westinghouse brake.) 41, figs. 298-9; 19, fig. 311. A faucet attached to the lower end of the steam-cylinder to draw off water of condensation. See also *Reservoir drain-cock*.
- Drain-cup, or drip-cup** (Westinghouse brake). 11, fig. 333. A globular receptacle under a triple valve to collect water of condensation. It is no longer used. See notes to figs. 332-3.
- Drain-pipe** (Lorenz refrigerator car). P, figs. 130-130½.
- Drain-pipe union** (Westinghouse air-pump, etc.). 41, fig. 298; 44, fig. 299.
- Drawbar.** 1. (Freight cars). Figs. 440-536; 23, figs. 82-142; 29, figs. 155-85; 1, figs. 383-400. An open-mouthed bar at the end of a car in which the *coupling-links* enter and are secured by a *coupling-pin*. They are provided with a *draw-spring*, which see, to give elasticity to the connection between the cars. Drawbars are either of cast or wrought iron, and in respect to their form are either (1) *bolt* or *spindle* drawbars, in which the draw-spring is attached by a bolt passing through its centre; or (2) *spring-pocket* or *strap* drawbars, in which the draw-spring is inclosed within a yoke surrounding it. Special forms of drawbars are the *Safford* or *open-mouthed*, and the *Potter* or *three-link* drawbars, which see. The New York Elevated Railroad uses the *centre-draft* drawbar, which see, figs. 167-8, attached directly to the centre-pin of the car. See also *Continuous draw-gear* and *Hoit double-spring drawbar*. The *solid-head* is a wrought iron drawbar forged in one piece instead of



having a drawbar face-plate riveted on. The standard dimensions for drawbars and their attachments, as adopted at the Thirteenth M. C. B. Convention, Chicago, 1879, are given with figs. 403-4. The standard height of drawbar, figs. 408, was by resolution of the M. C. B. Association, Richmond, 1871, fixed at 2 ft. 9 in. from top of rails to centre of drawbar. This was further qualified, 1884, as meaning 2 ft. 9 in. when the car was new and unloaded. Special forms of drawbars are used with *automatic freight-car couplers*, figs. 409-23, which see. The drawbar is frequently called *draw-head*, especially cast-iron drawbars, some of which, as figs. 461-4, etc., are very short. With certain coal cars a cheap form of drawbar, called a *draw-hook*, fig. 440, which see, is used. In England this style is almost universal in combination with plain links in freight-car service, and with a *screw-coupling*, which see, for passenger cars. See also note to *drawbar stop*. The drawbar of passenger couplers is also very frequently called a *coupling-hook*. See below. The rectangular space blocked out at each end by the drawbar follower-plates is sometimes called the *house of the drawbar*. See figs. 403-4. Certain drawbars in light freight cars are, for economy, bolted directly to *spring end-sills*, which see, avoiding all use of draw-springs.

2. (Cowell coupler.) 8, figs. 539-541. The long bar to which with the *draw-head* (13) is attached, the two forming the Cowell coupling. The rear portion of the drawbar is constructed of the *drawbar side-plates* (15) connected by rivets.

3. (Janney coupler.) 29, figs. 164-8; 1, figs. 542-4; 39, figs. 555-601. Called the *Janney passenger or freight coupler*. It consists of two parts, the *Janney* (or *combination*, which see) *head*, and the *Janney knuckle*.

4. (Miller coupler.) The *drawbar coupling-hook*, 11, figs. 636-43.]

**Drawbar bolt.** 4, fig. 449; 7, figs. 389-99. A bolt or spindle which connects a drawbar to a draw-spring and follower-plates, passing through the centre of the latter. See *Drawbar*.

**Drawbar carry-iron.** 9, figs. 383-400; 201, figs. 93-6, 113. A transverse iron bar bolted to the under side of the *draw-timbers*, and on which the drawbar rests. It is usually U-shaped, and the ends are bolted to the end-sills, but sometimes flat, with *draw-timber guards* at the

side. The drawbar carry-iron of the Janney and Cowell coupler is called the *stirrup*.

**Drawbar chafing-plate** (Miller coupler). 48, fig. 638. An iron plate framed into the *platform truss-beam* 22, above the drawbar coupling-hook, to protect it from abrasion.

**Drawbar coupling-hook** (Miller coupler). 11, figs. 636-40. The Miller *drawbar*, which see.

**Drawbar cross-timber** (four wheel coal cars). 138, figs. 105-6. A transverse timber framed into the centre sills, to which the ends of the draw-timbers are attached.

**Drawbar distance-piece** (wrought-iron drawbars). 2, fig. 450; 4, fig. 359. A block of iron between the upper and lower plates. In many cases it serves as a thimble for the rivets.

**Drawbar face-plate** (wrought-iron drawbars). 2, figs. 388-9; 3, figs. 450-536. The outer end of a drawbar, and which bears against a similar plate on the car next to it. When such a plate is made in one piece with the drawbar, it is called a *drawbar head*.

**Drawbar follower-plates.** 14, figs. 383-400; 15, figs. 387-90. A pair of iron plates which bear against each end of a draw-spring, and transmits the tension and compression on the draw-bar to the draw-springs. See *Auxiliary drawbar follower-plate*.

**Drawbar friction-plate** (street cars). A cast-iron plate through which the drawbar passes, attached to the platform end-timber, to protect it from abrasion.

**Drawbar guides.** 13, figs. 383-404. Wrought-iron bars which are fastened in pairs to the top and bottom of the lugs or *stops* bolted to the draw-timbers on each side, forming guides in which the *drawbar follower-plates* move. A *drawbar jaw*, which see, is sometimes used as a substitute for both the guides and stops.

2. (Logging cars.) Fig. 1758.

**Drawbar head** (wrought-iron drawbars). 3, figs. 383-400. The outer end of a solid drawbar, which bears against a similar head on the adjoining car. When it is made in a separate piece from the drawbar, it is called a *drawbar face-plate*.

**Drawbar (house of).** Figs. 403-4. The total space within which the follower-plates move or can move. See *Drawbar*.

**Drawbar jaw.** 16, figs. 395-397. A U-shaped iron strap which serves as a combined *drawbar guide* and *draw-*

*bar stop*, which see; or as a stop for the drawbar followers or draw-spring plates. See also *Drawbar side-casting*.

**Drawbar packing-blocks.** 186, figs. 93-4. A rectangular piece gained into the draw-timbers and centre-sills and serving to prevent longitudinal movement. See *Packing-block*.

**Drawbar pocket** (strap or spring-pocket drawbars). Fig. 450. A *drawbar spring-pocket*, which see.

**Drawbar safety-lug.** Figs. 469, 477, 481, 505, 527. A horn on the upper side of a drawbar to bear against the end-sill on a single dead-block on the end-sill, to relieve the draw-spring, etc., from excessive buffing strains. Little used.

**Drawbar sector** (centre-draft draw-gear, New York Elevated Railroads). 33, figs. 167-8. A guide for the drawbar, shaped like an arc of a circle, fastened underneath the platform.

**Drawbar side-casting.** Fig. 447. An iron casting, of which a pair serve as combined *drawbar guide* and *stop*, which see, for the followers to hold them in their places. A *drawbar jaw* is a wrought iron substitute and equivalent.

**Drawbar side-plates** (Cowell platform and coupler). 15, figs. 539-541. Two plates connected by rivets, constituting the rear portion of the drawbar.

**Drawbar side-spring** (Cowell platform and coupler). 17, fig. 540. A spring attached to the *stirrup*, or drawbar carry-iron, to give the drawbar the necessary lateral motion in coupling. It takes the place of the Miller *leaf-spring* or *coupling-spring*.

**Drawbar spindle, or stem.** 7, fig. 448; 4, fig. 449. The *drawbar bolt* which passes through the centre of the draw-spring and follower-plates in a bolt or spindle drawbar.

**Drawbar spring-pocket.** 1, figs. 450, 452. The space at the back end of a spring-pocket or strap drawbar which receives the draw-spring and follower-plates.

**Drawbar stem.** A *drawbar bolt*, which see.

**Drawbar stirrup.** A *drawbar carry-iron*, which see.

**Drawbar stop.** 17, figs. 387-9, 383-4. A casting which limits the movement of the drawbar followers, bolted to the drawbar timbers and forming distance-pieces to which the *drawbar guides* are bolted. The castings for the drawbar stop are now sometimes made long enough to bear against the body-bolster, thus relieving lugs and bolts of strain. *Drawbar side-castings*, or wrought iron

*drawbar jaws*, which see, are used as a substitute for both stops and guides.

**Drawbar washer** (logging cars). Fig. 1759. A follower-plate on a small scale.

**Drawbar yoke.** A *drawbar carry-iron*, which see.

**Draw-chain** (English). See *Wagon coupling*.

**Draw-clevis** (street cars). A wrought-iron bar with forked end attached to the platform, to which the horses are attached. Two kinds of these are used, one fastened to the platform so as to be immovable, the other a *spring draw-clevis*, can slide lengthwise, and its motion is resisted by a spring.

**Drawer-pull.** Fig. 1042. A wooden or metal attachment to a drawer to take hold of in pulling it out. In postal cars they are combined with label-holders, fig. 1077.

**Draw-gear, freight.** Figs. 383-400.

“ “ (M. C. B. standards). Figs. 401-408.

“ “ (automatic couplers). Figs. 409-423.

“ “ (continuous). Figs. 424-427.

“ “ (coupling links, etc.). Figs. 428-439.

“ “ (drawbars). Figs. 440-536.

“ “ (English). Figs. 116-119.

“ **passenger** (Cowell). Figs. 537-541.

“ “ (Janney). Figs. 542-553.

“ “ (Jauney-Miller). Figs. 554-635.

“ “ (Miller). Figs. 636-643.

“ “ (Elevated Railroad of N. Y.) Figs. 167-168.

“ “ (English). Figs. 205-207.

**Draw-gear.** Figs. 383-643. A term used to designate the drawbars, draw-timbers, buffing apparatus, and all their attachments—in short, the whole of the arrangements by which a car is drawn and which resists concussion. See the various heads above. Also *drawbar*, *draw-head*, *draw-timbers*, etc.

**Draw-gear tie-rod.** 139, figs. 88-96, 106, 140. A rod which connects an end-sill or platform end-timber with a body-bolster or drawbar cross-timber to tie them together.

**Draw-head.** 1. A *drawbar* is very commonly called a *draw-head*, especially short cast-iron drawbars. See also *Drawbar-head*.

2. (Cowell platform and coupler.) 13, figs. 538-541. The pivoted head of the *drawbar*. When closed and locked with the key shown in fig. 539, the whole resem-



bles the Miller coupler in appearance, but operates in coupling more like the Janney.

**Draw-hook.** 1. (Coal cars and street cars.) Fig. 440; 7, fig. 109; 106, figs. 1843-6. An iron hook attached to the end of a car, from which it is drawn and by which it is coupled to other cars. The Miller draw-hook is called the *drawbar coupling-hook*, which see.

2. (English.) 40, figs. 116 and 205. A strong hook at the end of the drawbar, which receives the link of a coupling-chain of the adjoining vehicle, in order to transmit the draught. A precisely similar arrangement to that used on many American coal cars. In England universal for freight cars (goods wagons). A *screw-coupling*, which see, is generally used on passenger cars (carriages).

**Draw-hook washer, or drawbar front-plate** (English). 145, figs. 116-8. American equivalent, *draw-hook plate*. A wrought or cast-iron plate secured to the *head-stock*, guiding the drawbar and receiving its rebound.

**Drawing-room car.** Figs. 52-3, 210, etc. A luxurious passenger car for day travel, furnished with arm-chairs, sofas, carpets, etc. An extra charge is usually made to passengers who travel in them, and they are run by separate companies like sleeping cars under contract with the railroads. Also, and perhaps more commonly, termed *parlor car* or *chair car*, which see; sometimes extravagantly *palace car*. See *Bay-window parlor car*. Fig. 210 and frontispiece.

**Draw-off cock** (Baker heater). Fig. 1328. A cock attached to the pipe A, fig. 1301, for emptying the pipes. It is a *combination cock*, which see.

**Draw-rod.** 1. (Continuous draw-gear.) 4, figs. 424-5, 182, figs. 113-5. A rod which unites two drawbars at opposite ends of a car, and relieves the draw-timber attachments from strain.

2. (Hoit draw-gear.) 5, fig. 426, and 182, figs. 94-6. The rod connecting the *draw-spring* 3, and *buffer-spring* 4, transmitting tensile strains to the draw-spring. The *cross-frame tire-rods* or *centre draw-rods*, 6, take the place of the draw-rod under the centre of the car.

**Draw-spring.** 1. 24, figs. 88-143; 30, figs. 155-85; 5, figs. 333-400. A spring attached to a *drawbar* (which see) to give elasticity. They are usually so arranged by means of *follower-plates* at each end as to resist either tension or compression. The usual size for draw-springs is

5½ inches in diameter and from 4 to 8 inches in length, double coil spiral springs. Formerly volute springs, fig. 2052, and rubber springs, fig. 2042, were much used for buffer springs, but rarely at present. See *Auxiliary buffer-spring*.

The M. C. B. Association recommended (1884) "That the capacity of *draw* and *buffer springs* be not less than 18,000 pounds, instead of 13,000 pounds, as recommended at the 13th Annual Convention."

An occasional substitute for draw-springs in narrow-gauge and other cheap cars is the *spring end-sill*, which see.

2. (Hoit draw-gear.) 3, figs. 426-7. The spring placed under the *centre* of the car, abutting against the needle-beam, and sustaining tension strains only; a separate *buffer-spring*, 4, being used at the front of the car.

3. (English.) Figs. 117, 206. A long, half-elliptic spring reaching entirely across the car. Rubber draw-springs are more generally used, especially with continuous drawbars.

**Draw-spring cradle-plate** (English). 146, figs. 116-7. A longitudinal plate in the *under-frame*, which supports the *draw-spring*.

**Draw-spring pocket.** Figs. 450, etc. A *drawbar spring-pocket*, which see.

**Draw-spring stop.** 8, fig. 389. A metal sleeve or thimble in the centre of a spiral or volute draw-spring to resist excessive compression. Not to be confused with a *draw-bar stop*, which see.

**Draw-timbers.** 10, figs. 383-400; 100, figs. 1843-6; 26, figs. 82-148; 31, figs. 155-85. A pair of timbers, carrying the drawbar attachments, placed below the centre-sills, and usually extending from the *platform end-timber* of passenger cars, or the end-sill of freight cars, to the body-bolster. In passenger cars these timbers are usually the principal supports of the platform. See *Platform-sills* and *platform short-sills*. On street cars only one draw-timber is ordinarily used, placed in the centre of the car, to which the drawbar is attached. The draw-timber in a tip car, 26, fig. 143, is also termed a *car-perch*.

**Draw-timber carry-iron.** 1, figs. 391-4. A  $\Lambda$ -shaped bolt for holding the draw-timbers firmly to the centre-sills, in use on the Norfolk & Western Railroad, the East Tennessee, Virginia & Georgia, and some others. It

- should not be confused with a *drawbar carry-iron*, 9, figs. 395, etc.
- Draw-timber carry-iron pin.** 2, figs. 391-4. The pin supporting the apex of the  $\Lambda$ -shaped draw-timber carry-iron. It rests upon a small casting or wrought plate.
- Draw-timber carry-iron washer-plate.** 4, figs. 391-4. Plates placed at the lower extremities of a draw-timber carry-iron to serve as washers.
- Draw-timber guards.** 11, figs. 388-400. Cast-iron lugs, or wrought plates, bolted to the sides of draw-timbers over the *drawbar carry-iron*, which see, when the latter is a mere flat strap, to resist lateral strains and protect the draw-timbers from wear.
- Draw-timber pocket.** 18, figs. 387-9. A casting attached to the body-bolster or centre-sills of a car to receive the end of a *draw-timber*.
- Draw-timber tie-bar.** 12, figs. 388-400. A transverse iron bar attached to the under sides of a pair of draw-timbers to tie them together.
- Dressing-room.** Fig. 208. Another name for a *saloon*, especially one provided with wash-bowl and toilet facilities. The ladies' saloon of sleeping and parlor cars is commonly so fitted.
- Drilling.** A term used in New Jersey for *switching*, which see, or making up trains. *Regulating* is another term sometimes used. The English term for this is *marshaling* or *shunting*.
- Drip.** 1. A receptacle to collect waste or superfluous liquid, as the *water-drip* of a water-cooler. See *Urinal drip-pan*, fig. 1103.  
2. (Dining-car kitchens.) Fig. 193. A lower sink receiving the drainage therefrom.
- Drip-cock** (Westinghouse brake). Fig. 293. The cock at the bottom of the drip-cup.
- Drip-coupling, or basin-coupling** (wash-basin). 1-2, fig. 1572. The connection of the waste-pipe, or drip-pipe with the basin.
- Drip-cup** (Westinghouse brake). Fig. 293. A receptacle inserted in the brake-pipe of each car to receive water condensing therein.  
2. (Student lamp.) D (or 20), figs. 852-4.
- Drip-cup screw** (Student lamp). E, figs. 852-4.
- Drip-dish** (refrigerator car). E, fig. 131. A dish or pan at one corner or end of the car for receiving the water

- from the melting ice, usually permitting it to escape by a *trap*, which see.
- Drip-hole** (Moehring argand lamp). d, figs. 849-50.
- Drip-pipe** (alcove). 4, figs. 1594-4½, 1600.
- Drip-shield** (Moehring argand lamp). e, figs. 849-50.
- Drip-spout** (Moehring argand lamp). f, figs. 849-50.
- Drip-valve.** 1. (American steam driver-brake.) 6, figs. 358-9. A form of *steam-trap*, which see.  
2. (Eames ejector.) 58, figs. 282-8.
- Driver-brake pipe** (Westinghouse brake). 22, fig. 297. In the most recent gear this pipe is not used as shown in the engraving. See note therewith.
- Driving-chain** (pile-driver car). 43, fig. 1822. A *pitch-chain* (which see) used to make the pile-driver car self-propelling, by engaging with the *pitch-gear* attached to one of the axles. Such cars are not usually made self-propelling.
- Driving-gear** (lever hand-car). 9, 10, figs. 1724-6. It consists of the spur-wheel, or gear-wheel, and pinion.
- Driving-wheel brake, or driver brake** (air, figs. 295-323; steam, figs. 358-65). A brake applied to the driving-wheels of a locomotive. They are now in increasing use, but still the exception. Any of the air-brakes are or may be so applied. A steam brake, manufactured by the American Brake Co., has also been quite largely introduced, two forms of which only, the *horizontal cylinder* and *bell-crank* steam driver-brakes, are illustrated. The other forms are the *single-driver* brake and the *spring-toggle* brake, not shown by illustration. The single-driver brake uses a set of levers somewhat analogous to the ordinary brake-gear. The spring-toggle brake is very similar to the horizontal-cylinder driver-brake, figs. 358-9, but interposes a spiral spring between the push-bar and the brake-block to equalize the pressure.
- Driving-wheel brake-cylinders** (Westinghouse). Figs. 308-10, 314-15. (American Brake Co.) Figs. 358-65.
- Driving-wheel brake-hose** (Westinghouse brake). 53, fig. 311.
- Drop** (of lamp). 9, 9, figs. 828-33. "The drop of a centre lamp is its extreme length," measured from the ceiling to the lowest part of the lamp.
- Drop-bottom.** See *Drop-door*.
- Drop-bottom car.** Figs. 16-23, 29-32, 35-8, 105. A car so



constructed that its contents can be readily unloaded from the bottom by means of drop-doors.

A distinction is sometimes made between a *hopper-bottom* car, fig. 20, which will discharge all its contents without assistance on opening the drop-doors, and a *drop-bottom* car, as figs. 16-18, which will not do this; but, practically, drop-bottom and hopper-bottom are used as synonymous terms.

Drop-bottom cars are usually gondola cars.

**Drop-bottom car, brake for.** Fig. 228. A brake specially arranged to have no parts under the centre of the car to interfere with the drop-doors. See *Brake* and *brake-gear*.

**Drop-door.** 123, figs. 105-7; **F**, figs. 109-12. A door at the bottom of a drop-bottom or hopper-bottom car for unloading it quickly by allowing the load to fall through. Drop-doors are usually, if not invariably, in pairs, and are supported by a *drop-door chain* wound upon a *winding-shaft*, which see. A *drop-door beam* extends across the car above the winding-shaft to assist in supporting it and to stiffen the car.

**Drop-door beam.** 126, figs. 105, 107. See above.

**Drop-door chain.** 124, figs. 105-7. 2, figs. 109-12. A chain attached to the *winding-shaft* and the *drop-doors*, which see. Also termed *hopper chain*.

**Drop-door hinge.** 125, fig. 105. See above.

**Drop-down frame** (seat cushions). Figs. 1213-5, etc. One made so as to drop the slats supporting the seat-springs below the level of the seat-rails so as to enable higher and easier springs to be used.

**Drop forging.** One made under the steam hammer by the use of a die.

**Drop-table** (dining-car kitchens). Fig. 193. A table hinged to the wall so as to drop against it out of the way when desired.

**Drop-letter-box plate.** Fig. 1071. A *letter-drop*, which see.

**Drop-rack** (Hartley chair). 4, figs. 1156-7. A rack by which the position of the back of the chair is regulated.

**Drum.** 1. "A cylinder over which a belt or band passes.

2. "A chamber of a cylindrical form used in heaters, stoves and flues. It is hollow and thin, and generally forms a mere casing, but in some cases, as steam-drums, is adapted to stand considerable pressure."—*Knight*. See *Brake-shaft drum*. *Circulating drum* (Baker heater). *Expansion-drum* (Searle-heater).

3. (Creamer brake, which see.) 1, fig. 263.

4. (Hoisting-gear.) 8, figs. 77-8. **D**<sub>4</sub>, figs. 151-3. The main cylinder upon which the hoisting-rope is rolled up. The *spur-wheel* is carried on the same shaft.

**Drum-cover.** 1. (Baker heater.) Fig. 1330. A sheet-iron covering for the circulating-drum on the outside of the car.

2. (Creamer brake, which see.) 12, figs. 263-4.

**Drummond fastening** (English). Fig. 2157. As applied to railroad wheels, a mode of securing the tire to the wheel, which prevents their coming asunder should the tire break or become loose. The tire is turned to the dotted line on the left hand of fig., and when hot, is hammered into shape shown in full lines in section, securing the *retaining-ring* in position. See also *Tire fastening*.

**Drum-shaft** (of a derrick or crane). 23, figs. 77-8. The shaft on which the winding-drum is carried.

**Drum-support** (Baker heater). Fig. 1327. A bracket on the roof to hold the circulating-drum.

**Dual burner.** Figs. 873-7. A coal-oil lamp-burner with two wicks, each in a separate tube, by which a double flame is obtained. The *Taber* burner has two wicks in a single tube.

**Duck.** A flax fabric, lighter and finer than canvas, for use in car upholstery. It is usually manufactured in rolls 18, 24 and 40 inches wide and about 40 yards long. *Roofing duck* (used for street-car roofs) is manufactured of many different widths up to 12 feet, so as to entirely cover the roof when desired.

**Dump-car.** A term used to designate both *drop-bottom* and *tip cars*, which see.

**Duplicate elliptic spring.** Figs. 2034, etc. A double elliptic spring, which see.

**Duplicate-hose coupling** (Westinghouse). Fig. 335. A device to guard against the danger of a *brake-hose* (which see) bursting, by using a double hose connection with a ball-valve in the T. Not in general use.

**Dust-arrester** (of Pintsch gas pressure-regulator). Fig. 813. A cavity closed at each end by a perforated plate to prevent dust entering to clog the regulating valve.

**Dust-collar.** 16, figs. 2002-3, 2011. A grooved wrought-iron ring sometimes but not generally placed on a car-axle between the hub of the wheel and the journal to receive and hold a dust-guard.

- Dust-door** (Gouge heater). Fig. 1418; **21**, fig. 1408½. A door to clean out the bottom of the *case*.
- Duster**. See *Feather-duster*. Fig. 1041.
- Dust-guard**. **15**, figs. 2002, 2004, 2005, 2011. A thin piece of wood, leather or vulcanized fibre, inserted in the *dust-guard chamber* at the back of a journal-box, and fitting closely around the *dust-guard bearing* of the axle. It is to exclude dust and prevent the escape of oil and waste. Sometimes called *axle-packing* or *box-packing*.
- Dust-guard bearing** (of an axle). **D**, figs. 1974-8. See above.
- Dust-guard chamber** (of a journal-box). **15**, figs. 2002-11. See above.
- Dust hand-hole** (street car). An opening in the *door-casing*, which see, under the seat, to give access to the space into which the door slides for the purpose of removing dirt.
- Dutchman**. A block or wedge of wood driven into a crevice to hide the consequences of bad fitting in construction. A kind of *shim*.

## E

**Eames vacuum brake**. Figs. 266-88. A system of continuous brakes, invented by Fred. W. Eames, operated by exhausting the air by an *ejector*, which see, from behind flexible india-rubber *diaphragms* attached to each truck. These diaphragms are directly connected to the brake-levers, and the pressure of the air on the outside of the diaphragms is thus communicated to the brake-shoes. The rubber diaphragms cover the mouth of a large cast-iron *diaphragm-shell* or bowl.

This brake is in use on the New York Elevated railroads, on which the number of stops is very great, and several other lines. The advantage of the plan is its simplicity. The disadvantage, especially for high-speed trains, is that it does not act so quickly as the Westinghouse automatic.

**Ear**. A general name for projections to which handles or other exterior parts are attached, but more especially applicable to projections intended for movable attachments. See *Ear* to padlock, figs. 1035, etc. And *Ear-bail*, below.

**Ear-bail** (lanterns). Figs. 981-5. An attachment formed

of wire connected with the wire-guard, to which the bail is attached instead of to the body of the lantern.

**Eastlake style**. A style of ornamentation consisting of lines intended to indicate structural features, or some idea appropriate to the construction. The expression is also loosely applied to any style of construction where the framing is exposed to view, and made ostentatiously strong. It had its origin in Charles L. Eastlake's book, "Hints on Household Taste." *Queen Anne* style, which see, is an entirely different thing, though the two are often improperly confused.

**Eastman heater car**. See *Heater car*.

**Eaves fascia-board**. **1**. (Freight cars.) **91**, figs. 82-95. A plain board connecting the sheathing with the roof.

**2**. (Passenger cars.) **92**, figs. 169-81. A projecting board on the outside of the lower deck, immediately under the eaves, which comes below and under the *eaves-moulding*.

**Eaves-moulding**. **1**. (Freight cars.) **90**, figs. 82-86. A plain strip sometimes used outside an *eaves fascia-board*, which see.

**2**. (Passenger cars.) **93**, figs. 155-85. An ornamental finish to the exterior angle of the lower deck, outside of and above the eaves fascia-board. A similar *deck eaves-moulding* is used for the upper deck.

**Eccentric-lever** (Westinghouse driving-wheel brake). **13**, figs. 322-3. An arm consisting of an *eccentric lever casting* and screw, or *eccentric-lever stud*, one end of which is attached to a brake-head and the other connected with the piston-rod by the *eccentric-lever links*. The end or head of the casting is made of a cam-shaped or eccentric form, and bears against another lever of the same kind, so that, when the two are raised upward, the brake-shoes are forced against the driving-wheels. The stud or screw is intended to either lengthen or shorten the lever so as to adjust the pressure of the brake-shoes against the wheels when the shoes become worn.

**Eccentric-lever casting**. **15**, figs. 322-3. See above.

**Eccentric-lever links**. **28**, figs. 322-3. See above.

**Eccentric-lever nut**. **18**, figs. 322-3. A lock-nut which screws on an eccentric-lever stud. See above.

**Eccentric-lever stud**. **19**, figs. 322-3. See above.

**Eccentric pivot-plate** (for seat-arms). Fig. 1179. A *seat-arm pivot-plate*, made eccentric only to get room for screw-holes. The eccentricity has no functional purpose.



**Eccentric window-button.** Fig. 1861. A round disk fastened by a screw which is not in the centre. See *Window-button*.

**Edge-rolled spiral spring.** Figs. 2063, 2072-3. A spring formed by rolling a flat bar edgewise. See *Spiral spring*.

**Egg-shaped lamp-globe.** Fig. 951. See *Lamp-globe*.

**Egg-shaped stove.** Fig. 1479. A stove resembling an egg in form. It is commonly known simply as a *cast-iron stove*, and is very largely used for cabooses, etc., where appearance is not important.

**Eight-group spiral spring.** Figs. 2081-2. See *Spiral spring*.

**Eight-wheeled car.** Figs. 1-185, 1-3, 27-8, 43, 98. The standard type of American rolling-stock, consisting of a car-body carried upon two *trucks* or *car-trucks* (both of which see) of four wheels each. Great numbers of four-wheeled coal cars and a few four-wheeled box cars are in use and, on the contrary, most sleeping, parlor and dining cars are twelve-wheeled. Even sixteen-wheeled cars have been built, but *car* always means in America an eight-wheeled car unless otherwise specified.

**Ejector.** Figs. 282-8, 291-2. An appliance for operating a vacuum brake by exhausting or "ejecting" air. It consists essentially of a pipe, 1, fig. 291, placed in the centre of a surrounding shell or casing 2, with an annular opening 3, between the pipe and the casing. When a current of steam is admitted at the lower end of 1, and escapes at the upper end, the air in the casing at 4 is drawn out through the annular opening by the current of the escaping steam. The space 4 is connected by a pipe 5 with the appliances on the cars for operating the brakes. Suitable valves are also used in connection with the ejector to shut off and admit steam and air. The Smith ejector is very noisy. In the ejector for Eames' vacuum brake, figs. 282-288, a *muffler* is used to render noiseless the escaping steam. It consists simply of a box of small round balls, like shot, through which the steam must pass to escape.

**Elastic fibre journal-packing.** A compound, principally of cocoanut fibre mixed with jute, to serve as a substitute for waste. It is lighter, cheaper, and claimed to be more effective. See *Patent waste*.

**Elastic wheel.** Figs. 2129-30, etc. Any car-wheel in which some elastic material is interposed between the tire and the wheel-centre or hub to resist the concussions. Dif-

ferent substances are used, such as paper, wood, india-rubber, oakum, etc. The only wheel especially so named is the *Cooper elastic wheel*. Nearly all English passenger wheels are made of teak wood (figs. 2151-8) to effect this purpose.

**Elbow.** Fig. 1334. A short L-shaped cast-iron tube for uniting the ends of two pipes, generally at right angles to each other. See also *Cold-air elbow* and *Inlet elbow* (Gouge heater).

**Elbow-rail (English).** 108, fig. 205. In a carriage, a part of the body framing running horizontally along the sides at about the height of the elbow of a passenger in a sitting position.

**Elbow-rest (English).** See *Folding arm-rest*. *Side arm-rest*.

**Elder brake.** Fig. 234. A brake for eight-wheeled cars, with a horizontal *centre brake-lever* in the middle of the car connected to the brake-shaft, having a fixed fulcrum under the car body and pulleys at each end, over which a chain passes. The *live lever* (which see) of each truck also has a pulley or *brake-lever sheave* at its end, over which the same chain runs to apply the brakes.

**Electric lighting.** Various plans for the lighting of cars by electricity have now (1884) been tested with promising success, but as none of them as yet have obtained general introduction, and as the styles which will finally attain prominence, if any do so, are now doubtful, no definition nor illustrations of such systems of lighting are given in this edition.

**Eleven-group bolster-spring.** Fig. 2088. See *Spiral spring*.

**Elliptic seat-spring.** Figs. 1209, etc. See *Seat-spring*.

**Elliptic spring.** Figs. 2031-41. A spring of elliptical form made of two sets of parallel steel plates of constantly-decreasing length. Such springs are generally used for bolster-springs for passenger cars, but the tendency is to abandon their use in freight service in favor of spiral springs. *Half-elliptic* springs, fig. 2035, are also used to some extent as bolster-springs, and always for locomotive springs. In England they are almost the only bearing-spring used, and are also used as *draw and buffing-springs*, which see.

The *set* of elliptic springs is the total amount of bend or compression of which the spring is capable. The *arch* differs from half the set by the amount of the thick-

ness of the spring-band. The connection between the two halves of the elliptic spring at its extremities is termed the *scroll*. Elliptic springs in service are termed double or *duplicate*, triplets or *triplicate*, *quadruple*, *quintuple*, *sextuple*, etc., according to the number of springs used side by side and connected by a single eye-bolt so as to constitute practically one spring. In passenger-car service elliptic springs are usually triplicates, quadruples or quintuples. The *length* of the spring is the distance from centre to centre of scrolls when unloaded, and the *height* the height over all unloaded.

**Ely, Cloud & Wall refrigerator car.** Figs. 131-131½. One of the class of refrigerator cars which carry the ice in a horizontal box at the top of the car. See *Refrigerator car*. Invented by Theodore N. Ely, John W. Cloud and E. B. Wall, and patented in 1883. It is to some extent a compromise between the *Ridgway* and the "Diamond R" refrigerator cars.

**Emigrant-car cook-stove.** Fig. 1483. A form of car stove used only on emigrant cars, designed for cooking or heating food as well as for warming the car. For sizes and weights see fig. 1483.

**Emigrant car-seat (for day car).** Fig. 1143. (For sleeping car.) Figs. 685, 1149-53.

**Emigrant sleeping car.** Figs. 195-203. A cheaply finished car without springs or mattresses, but in other respects similar to ordinary sleepers, for the use of emigrants. Now used chiefly on the long runs west of Chicago, and to some extent used for ordinary travel, especially by parties of excursionists.

**Empire car-roof.** Figs. 667-9. See *Car-roof*.

**Enclosed step (street car).** 3, fig. 1842. A step which is covered or enclosed by a sheet-iron apron attached to a swinging door to prevent persons from riding on the step.

**End arch-rail (English).** 99, figs. 205-207. American equivalent, *end-plate*. A piece of timber run across the upper portion of the end of the body, its upper side being cut to the curve of the roof which it supports.

**End ascending-step (English).** 174, figs. 205-7. See *Ascending-rail*.

**End berth-rest, or single berth-rest (emigrant sleeping berths).** N, figs. 682-5. So called in distinction from the regular (double) berth-rest used on the berth-posts in the body of the car.

**End-board (English).** 68, figs. 116-119. American equivalent,

*end-plank*. A plank in the end of a "goods wagon" or gondola car.

**End body-brace.** 35, figs. 85, 91, 96, 104. See *Body-brace*.

**End body-brace pocket.** 35, figs. 82-101. See *Pocket*.

**End-body brace-rod.** 34', figs. 93-6; 51', figs. 164-8. See *Brace-rod*.

**End-brace tie-rod.** 175, figs. 93-6. (Erroneous reference. No such part shown.)

**End-carline.** 54, figs. 1843-4. A carline (which see) at the end of a car-body. See also *End-plate*. *Platform roof end-carline*.

**End-door (box cars).** Fig. 2. A door sometimes inserted to afford means for the insertion of long pieces of freight or lumber that cannot be entered by the main side-doors.

**End counterbrace (passenger car framing).** 166, fig. 159. More commonly, simply *counterbrace*. A brace in the side of a car-body, between its ends and the body-bolster. See *Counterbrace*.

**End compression-beam (passenger car framing).** 169, fig. 159. A timber directly above the sills over the body-holster against which the *compression-beam brace* and the *end counterbrace* abut. The *compression-beam* proper is situated at the middle of the car directly under the window-sills. The end compression-beam is sometimes omitted, as in figs. 644-645.

**End door sash-bolt.** Fig. 1670. See *Sash-bolt*.

**End door sash-lift.** Fig. 1669. See *Sash-lift*.

**End face-plate.** 1. (Janney coupler.) 8, figs. 542-555. The wrought-iron plate on the nosing of the Janney platform.

2. (Janney-Miller coupler.) 46, figs. 542-554, 555-601. See above.

**End-frame (of a car-body).** The frame which forms the end of a car-body. It includes the posts, braces, end-rail, end-girth, etc.

**End-girth.** 50, figs. 82-92, 132-138 (which see). A girth in the end of a box-car.

**End-girth tie-rod.** 51, figs. 84-5, 89, 91, 93, 96. A rod extending across the end of a freight-car body along the end-girth, from one corner-post to the other.

**End grab-iron.** 102', fig. 93. See *Grab-iron*.

**End half-longitudinal (English).** 6, figs. 116, 119 and 206. American equivalent, *intermediate sill*. A part of the *underframing* extending from the *cross-bearer* to the *headstock*.



**End-hook** (bell-cord). Fig. 715. A hook sometimes used on the ends of passenger cars, high up under the platform roof, for fastening the end of the bell-cord to.

**End-joint** (of running-pipe, Gouge heater). Fig. 1470. See *Running-pipe*.

**End lamp-iron** (English). 185, fig. 207. American equivalent, *tail-light holder*. A wrought-iron holder secured to the solebar or the end of the body in order to carry one of the colored signal or "tail" lamps, denoting the last vehicle of the train. See also *Side lamp-iron*.

**End-lining** (Gouge heater). Fig. 1429. The lining for the deflector-end of case, forming the air-chamber.

**End muntin** (English). See *End-stanchion*.

**End-panel**. 1. 70, figs. 157-183. A panel at the end and on the outside of a passenger or street car *below* the window. In street cars distinguished as *lower* and *upper*, both under the window. In passenger cars distinguished as *end window-panel*, alongside of the window, and *end-panel*, below it.

2. (English.) 127, fig. 207. A panel in the outside end of the body of a carriage, extending from the arch-rail to the *bottom end-piece*.

**End-piece** (wooden truck-frame). 17, figs. 1942-7, 1956-66. A transverse timber or bar of iron by which the ends of the two wheel-pieces of a truck-frame are connected together. A *crooked end-piece* is one cut away on top to clear the draw-gear. The *inside end-piece* is the one nearest the centre of the car, in distinction from the *outside end-piece*.

**End-pillar** (English). 97, figs. 205-7. An upright post in the end of the body.

**End-plank** (of a gondola car). 197, figs. 113-5. They are often hinged to the car-floor so as to drop down upon it.

**End-plate**. 48, figs. 82-92, 132-8. A timber across the end and top of car-body and which is fastened to the two side *plates*. It is usually made of the proper form to serve as an end-carline.

**End-play**. 1. (Of an axle.) The movement, or space left for movement, endwise.

2. (Of a truck-bolster.) Usually called *lateral-motion*. See *Swing-bolster*.

**End-rafter**. A term erroneously applied to the *end-carlines*, which see.

**End-rail**. 1. See *Wainscot end-rail* (lower and upper), 26 and 30, fig. 186.

2. (English.) 106, figs. 205, 207. A part of the body-framing running horizontally across the end of the vehicle.

**End roof-lights** (street cars). 62, fig. 1845. Small triangular-shaped glasses placed on each side of the end-ventilators.

**End roof-panel**. 11, fig. 186. The panel above the door and below the clear-story.

**End scroll-iron** (English). 89, fig. 205. A wrought-iron support for the *spring-link adjusting-screw*. The upper face is attached to the under side of the *solebar*, and the lower part is bored horizontally for the adjusting-screw. It is placed near the end of the vehicle, and hence differs somewhat in pattern from the ordinary *scroll-iron*.

**End seat-panel** (street car). 43, fig. 1844. An inside panel at the end of a longitudinal or side seat.

**End-sill**. 2, figs. 82-124, 155-85. The main outside transverse timber of a car-body into which all the floor-timbers are framed. In passenger cars it comes directly under the door, the *platform* (which see, with its various parts) being a separate construction. A *spring end-sill*, which see, is sometimes added outside of the end-sill proper as a substitute for a draw-spring. In England the end-sill is termed the *head-stock*. In iron frame cars, as A<sup>c</sup>, figs. 144-9, a wooden end-sill is commonly used, and bolted to an *end-sill channel-bar* with which the iron sills are connected, and which is the true end-sill.

**End-sill brackets** (of iron frame cars). C, figs. 146-150. L-shaped angle-plates used to connect the iron sills and the end-sill channel-bar. In bridge building such plates are termed *brackets*. When of triangular section they are termed *gussets*.

**End-sill channel-bar**. A<sup>4</sup>, figs. 144-9. See above.

**End-stanchion, or end-muntin** (English). 65, figs. 116-119. An upright bar at the end of a wagon, stiffening the end against shocks in switching.

**End-step** (street car). 1, fig. 1840.

**End-stop** (Raoul journal-box). Fig. 2014. See also 2004-12. A brass block inserted upon the inside of the lid to take up the end-thrust of the axle. End-stops were formerly much used, with ordinary journal boxes and axles, but rarely now. See *Stop journal-bearing* and *stop-key journal-bearing*.

**End-timber.** See *Platform end-timber* or *buffer-beam*, also *end-sill*.

**End truss-plank.** 32, fig. 186. See *Truss-plank*.

**End-ventilator.** 142, fig. 158. An aperture for the admission or escape of air at the end of a car, usually placed over the windows. See also *Deck end-ventilator*, and the *end-ventilator* for fruit car, figs. 121-125.

**End ventilator-opener.** Figs. 1604-17. See *Deck-sash opener*.

**End wainscot-panel.** 28, fig. 186. See *Wainscot-panel*.

**End window-panel.** 71, fig. 157. A panel at the end and on the outside of a passenger car *alongside* of the window, in distinction from the *end-panel* proper, which is below the window.

**Engine and air-pump complete** (Westinghouse brake). Figs. 298-9, 304-6. A machine attached to a locomotive for compressing air. It consists of a *steam* and an *air-cylinder*, the pistons in which are connected to the same piston-rod, so that the *air-piston* is worked directly by the *steam-piston*. Suitable valves are provided for admitting and exhausting the steam and air to and from the cylinders. See *Reversing-valve*, etc.

**Engineer's brake-valve** (Westinghouse brake). Figs. 294, 334. The valve now used instead of the old three-way cock, figs. 318-9, for applying and releasing the brakes. It differs from it in permitting more delicate graduation of the force with which the brakes are applied.

**English first-class carriage.** Figs. 204-207. See *Carriage* and *first-class carriage*.

**English wagon.** Figs. 116-120. See *Wagon* and *van*.

**English wheels.** Figs. 2151-80. See *Steel-tired wheel*. *Mansell wheel*. *Teak-wood centre-wheel*.

**Equal-bar nest-spring.** Fig. 2061, etc. A nest-spring of any number of coils, each bar of which is, or is supposed to be, of the same total length, so that the resistance of each coil may be more nearly equal. The name means little. See *Spiral spring*.

**Equalizer.** 1. A short term for an *equalizing-bar*, which see.

2. (Cowell coupler.) 2, fig. 533. See *Rock-lever*.

3. (Janney coupler.) 6, figs. 542-554. The bar connecting the two buffers and having a bearing against the *centre-buffer spring*.

**Equalizer-block.** 207, figs. 97-101. See *Brake-equalizer block*.

**Equalizer-guides** (Janney-Miller coupler). 47, figs. 542-554; 49, figs. 542-554, 555-601. Cast-iron chafing-plates bolted to the main knees of the Janney platform, above and below the equalizer.

**Equalizer-spring.** 79, figs. 1955-69, 2067, 2092. A spring which rests on an equalizing-bar and carries the weight of a car. Single or two-group spiral springs are generally used for this purpose. Rubber and volute springs are practically out of use.

**Equalizer-spring cap.** 72, figs. 1955-69. A casting on top of the spring, which bears against the under side of the wheel-piece and holds the spring in its place.

**Equalizer-spring seat.** 73, figs. 1955-69. A casting which sets on an equalizing-bar and on which the spring rests. See *Spring-plate*.

**Equalizer-strap.** 208, figs. 97-101. See *Brake-equalizer strap*.

**Equalizing-bar** (passenger car trucks). 71, figs. 1955-69, etc. Commonly abbreviated into *equalizer*. A wrought-iron bar which bears on top of the journal-boxes, and extends longitudinally from one to the other. *Equalizer-springs* rest on it between the two boxes. It is used to transfer part of the weight on one wheel to the other, and thus equalize it on both; hence its name. Equalizer-bars are sometimes used to connect the ends of semi-elliptic springs, as in figs. 102, 1959.

**Equalizing-bar pedestal** (four-wheel caboose cars). 164, fig. 102. A casting serving to give a fulcrum to the centre of an equalizing-lever.

**Equalizing-bar seat.** 17, figs. 2002-3. The surface on top of a journal-box on which an equalizer rests.

**Equalizing brake-lever.** A *floating-lever*, which see. The centre brake-lever, 209, figs. 97-101, is also, with little propriety, so called.

**Equalizing lever.** An *equalizing-bar*, which see. A *floating-lever* is also called an equalizing-lever.

**Equalizing-valve** (Westinghouse brake). A valve for use on long trains to equalize the pressure in the brake-pipe and prevent the inequality of pressure in the front portion of the pipe during the brief period in which the brakes are being applied by release of air from the brake-pipes, from tending to first apply and then immediately release the brakes on the forward cars, owing to the rush of air from the rear portion of the train.

**Escutcheon.** 1. Figs. 1000, 1002, 1025; 4, figs. 1176-7. A



plate or guard for a key-hole of a lock. Similar plates for the holes through which door-knob spindles pass are also called escutcheons, but more commonly rose. See *Seat-lock escutcheon*. An *escutcheon-plate* is often attached to an escutcheon to cover the key-hole.

2. (Yale lock.) Figs. 1027-28. A revolving post provided with holes to carry the pins which act as tumblers. When the key with corrugated edge is inserted, each of these tumblers is raised so that the joint comes exactly at the edge of the escutcheon, thus permitting revolution.

3. (Padlock.) Fig. 1033. More properly an *escutcheon-plate*. See above.

**Escutcheon-plate** (seal-lock). A, fig. 1011. See *Escutcheon*.

**"Eureka" spiral seat-spring**. Fig. 1229. See *Seat-spring*.

**"Eureka" ventilator**. Fig. 1564-5. See *Ventilator*.

**"Excelsior" ventilator**. Fig. 1560-1. See *Ventilator*.

**Excursion car**. 1. Fig. 49½. A light, open-sided car, with reversible seats running entirely across it, largely used for short-distance summer travel, to resorts near large cities.

2. A special form of palace car kept for rent at fixed rates per day to parties or individuals. They are similar in arrangement to the ordinary forms of officers' or other private cars, except that they usually have a greater number of berths, commonly sixteen, and two or more staterooms in addition. They are provided with kitchen and other conveniences like a hotel car, and are kept for lease by most of the leading sleeping-car companies, as well as by a special company, organized for that purpose alone. They vary in extreme length from 59 to 69 feet or more, and in length of body from 51 to 62 feet.

**Exhaust-pipe** (of engine, Westinghouse brake). 7, figs. 298, etc. A pipe through which the exhaust steam is conveyed from the steam-cylinder to the chimney.

**Exhaust-pipe** (Eames ejector). 53, figs. 282-8.

**Exhaust-pipe union** (Westinghouse air-pump, etc.). 15, fig. 298, and 36, fig. 299.

**Exhaust-union** ("American" steam brake-valve). 10, figs. 360-2.

**Exhaust ventilator** (for closet-hoppers). Figs. 1097-8. See *Bell's exhaust hopper-ventilator*.

**Expander** (Westinghouse brake). See *Brake-hose-coupling packing-expander*. *Piston-packing expander*.

**Expanding collar** (for lamp). Fig. 910. One used to enable a larger-sized burner to be used. See *Collar*.

**Expansion-drum** (Searle heater). Figs. 1484-5. An equivalent in all essential respects to the *circulating-drum* of Baker heater, which see.

**Express car**. Figs. 59-65. A car for carrying light packages of freight for express companies on passenger trains. Also see *Combination baggage car*, fig. 58.

The express business was originated in 1839 by William F. Harnden, who traveled for some time as a messenger between New York and Boston; but it was not for a long time thereafter that it grew to sufficient dimensions to require separate cars. Alvin Adams, founder of the Adams Express Company, began business in 1840. At present complete trains of express cars are occasionally required.

**Express hand-car**. Fig. 1711. A hand-car with large wheels to run at a high speed. Several different designs exist not called by this name, but accomplishing, or seeking to accomplish, the same end. See *Hand-car*.

**Extensible car-step**. A form of step for passenger car service recently introduced, but not in general use, by which a lower step can be dropped down into position while the train is standing, and removed again out of the way by a motion of the foot when the train gets under way.

**Extension-reach** (logging cars). Figs. 1727-1812. The *reach* is a long bar connecting the two trucks. The *extension-reach* is adjustable.

**Extension-reach end** (logging cars). Fig. 1781. A strap for the end of the extension-reach.

**Extreme bottom** (Bissell beater). Fig. 1377. The lower outside shell of the safety water-base.

**External cylinder-gauge**. A steel ring with a cylindrical hole which is very accurately made of a precise size, and used as a standard of measurement for the diameters of solid cylindrical objects.

**External screw-gauge**. Fig. 1832. A steel ring with a very accurate screw-thread in the inside for testing screw-threads. See *Internal screw-gauge*.

**Eye**. "A small hole or aperture."—*Webster*.

See *Body check-chain eye*.

*Berth-brace eye*.

*Bull's-eye*.

*Lamp-case eye*.

*Parallel brake-hanger*

*eye*.

*Check-chain eye.*                      *Switching-eye.*  
*Coupling-pin-chain eye.*      *Truck check-chain eye.*

**Eye-bolt.** 1. Figs. 1797, 1872. "A bolt having an eye or loop at one end for the reception of a ring, hook, or rope, as may be required."—*Knight*. See *Bolt*; also

*Brake-beam eye-bolt.*              *Lock eye-bolt.*  
*Brake safety-chain eye-bolt.*      *Lock-chain eye-bolt.*

2. For *Miller hook* (Janney-Miller coupler). 66, figs. 542-554, 602-35. The part by which the swivel connected to the uncoupling lever is secured to the Miller hook. It is a  $\frac{3}{4}$  in. bolt.

3. For *side-spring* (Janney-Miller coupler). 67, figs. 542-554, 602-35. The eye-bolt by which the side-spring stirrup is secured to the horn. It is a  $\frac{1}{2}$  in. bolt.

4. (Of a wrecking car). 1, figs. 77-78. A bolt placed in the centre of the floor for attaching the hook of the hoisting gear, to keep the boom steady when the car is in motion.

**Eye-bolt link-hanger.** Fig. 2113. A special form of *swing-hanger*, which see, having a very short link attached to an eye-bolt passing through the transoms.

**Eye-bolt nut** (of engine signal-valve, West. train signal app's). 14, fig. 690.

**Eye-head coupling-pin.** Figs. 436-7, 445. So called in distinction from a *solid-head* or *bent-head coupling-pin*.

**Eyelet.** 1. Figs. 802-804. "A short metallic tube, the ends of which are flanged over against the object through which it passes. Used as a bushing or reinforce for holes."—*Knight*. In metallic eyelets of the usual form, the two halves which when compressed together form the eyelet are known as *grommets*. See *Carpet-eyelets*.

2. (Window-shade.) 3, fig. 1683. A slot in the window-shade leather to fit over the sash-lift, to hold the shade fast.

**Eyelet-nail.** Fig. 805. A wire nail with turned knob, for use with carpet eyelets.

**Eyelet shackle car-seal.** Figs. 1113-5. See *Car-seal*.

## F

**Face** (of rim of car-wheel). 24, fig. 2002. The vertical surface of the outside of the rim.

**Face-plate.** 1. A metal plate by which any object is covered, so as to protect it from wear or abrasion. A *journal-box cover* is sometimes called a face-plate.

See *Berth-latch face-plate.*      *Drawbar face-plate.*  
*Buffer-block face-plate.*      *End face-plate.*  
*Dead-block face-plate.*

2. ("American" steam driver brake). 14, figs. 363-5; 9, figs. 358-9. The means by which the cylinder is attached to the frame of the engine.

3. (Steel-tired wheels.) Figs. 2163-4, etc. The plates connecting the tire and hub, and bolted to each. They are distinguished as *front* and *back face-plates*.

4. (Wolfrath comb. sash-lift and lock.) H, figs. 1700-2.

**Facing.** "A covering in front for ornament."—*Webster*  
 See *Deck-sill facing*.

**Faggoted axle.** See *Axle*. *Car-axle*.

**Fall** (hoisting tackle). That part of the rope to which power is applied.

**Fall and tackle.** Another name for *block and tackle*, which see.

**Falling-door, or flap-door** (English). 70, figs. 116, 117 and 119. In a *gondola car* (*open wagon*), a door opening downwards and outwards, the hinges being on the lower side. It is generally arranged as shown, but is also made to open up to the top of the side, or to extend the whole length and depth of the side.

**Falling-door latch** (English). 79, figs. 116-9. A latch which automatically secures the falling door when elevated into a closed position.

**Fall-under, or turn-under** (English). 116, fig. 207. The distance which the bottom of the body curves in from a vertical line let fall from the sides or ends.

**Fare-box street car.** Fig. 1836. A street car in which the fare is deposited by the passengers in a box under the observation of the driver. They usually have an inclosed platform in front, and are entered only from the rear. They are turned around at the end of each trip, either on a turn-table or (rarely) on their own truck, and run without conductors.

**Fare-wicket** (street cars). 89, fig. 1845. An opening in the door for collecting fare or making change.

**Fare-wicket door-case.** 90, fig. 1845. See above.

**Fascia-board.** {See *Eaves fascia-board*. *Inside-cornice fascia-board*. *Inside-cornice sub-fascia-board*.

**Fascia-moulding** (English). See *Wrought moulding*.

**Fast berth-hinge.** Fig. 1239. See *Berth-hinge*.



ast coupling-link (Potter drawbar, which see). 2, figs. 449, 451. See also *Drawbar*.

Fast coupling-pin (Potter drawbar, which see). 3, fig. 449.

Fastener.

See *Berth safety-rope fastener*.

*Lamp-fastener*.

*Sash-fastener*.

*Window-fastener*.

Fast-joint butt-hinge. Figs. 779, etc. See *Hinge*. So called in distinction from a *loose-joint butt-hinge* or *loose-pin butt-hinge*.

Fast lamp-globe. Figs. 846-70. One which cannot be detached. Also called a *plastered globe*. See *Lamp-globe*.

Faucet. Figs. 1591-1602. A synonymous term with *cock*, which see for fuller definition.

Faucet-alcove. Figs. 1594, etc. A *water-alcove*, which see.

Feather-duster. Fig. 1041.

Feed-cock (Searle heater). Figs. 1484-5. A cock in the expansion-drum for supplying brine to the pipes. Also called a *filler*.

Feed-door (Baker heater). Fig. 1314; 13, fig. 1301. A door for closing the aperture giving access to the fire-pot or (in hase-hurners) magazine. See also *Fire-door*. Similar parts of other heaters are (Gouge heater) fig. 1450; (Kohler stove) F, fig. 1474; (Searle heater) figs. 1484-5; (Bissell heater) fig. 1359. It is surrounded by a *feed-door frame*.

Feed-door bolt (Gouge heater). Fig. 1419.

Feed-door chute (Bissell heater). Figs. 1356-1404. Another name for a tube-like *feed-door frame*. In the Bissell heater, however, an exterior feed-door frame, figs. 1370-98, is also used. *Chute* is a corruption of *shoot*.

Feed-door frame (Bissell heater). Figs. 1370, 1398.

Feed-door handle (Baker heater). Fig. 1315.

Feed-door lining (Gouge heater). Figs. 1451, 1415. A double plate to the feed-door, leaving an air-space between, as in locomotive fire-box doors.

Feed-door register (Bissell heater). Figs. 1365, 1391. A grating for the admission of air, closed by a slide.

Feed-door slide (Gouge heater). Fig. 1417. See above.

Feed-door spring (Gouge heater). Fig. 1419.

Feed-door stop (Gouge heater). Fig. 1419.

Feeder-cup and collar (for lamps). Figs. 915-6.

Feeder-screw and hoop (for lamps). Figs. 924-5.

Feed-tube (student lamp). 31, figs. 852-4. The tube connecting the reservoir with the burner. The standard by which the entire lamp is supported passes through it.

Feed-tube collar (student lamp). G, figs. 852-4.

Feed-valve. 1. (Westinghouse engineer's brake-valve.) 7, fig. 334.

2. (Of engine signal-valve, Westinghouse train signal app's.) 6, fig. 690. The valve regulating the supply of air from the main reservoir.

Felt-edge (for car-seats). Fig. 1225. A device for building up the edges of car-seat cushions, to do away with the *stitched-roll* generally used. It is simply a roll of felt stitched in such a manner as to fit over a cleat; and when tacked down it forms an even elastic face to the cushion.

Female centre-plate. The body and truck centre-plates are sometimes called male and female plates. See *Centre-plate*.

Female gauge. An *external gauge*, which see.

Fender. See *Door-fender* (street cars).

Fender-board. 7, fig. 686. A board at the end of passenger-car steps to prevent mud and dirt from being thrown on them by the wheels. More commonly, *string-board*. The *splash-board*, if used, goes on the back side of the steps.

Fender-guard. 22, figs. 1843-6. See below.

Fender-rail (street-car hodies). 21, figs. 1843-6. A longitudinal exterior rail between the belt-rail and the sill, and to which an iron panel called a *fender-guard* is attached to protect the panels from contact with other vehicles.

Ferry push-car. Fig. 72. A very long platform-car used for pushing or pulling other cars on or off a ferry-boat when the latter is approached by an incline too steep for locomotives, so that the latter can push or pull the cars without running on the incline.

Fibre-packing. See *Elastic-fibre journal-packing*. *Patent waste*.

Filler (for Winslow heater). B, fig. 1534, and E, fig. 1536.

A feed-cock for filling the *safety-tank A* with water.

Fillet. A small light moulding, as 1, 3 or 10, figs. 1050-64. More generally termed *beads*. See *Moulding*.

Filling-funnel (Baker heater). 28, fig. 1301; fig. 1323. A funnel attached to the combination-cock for filling the circulating-drum with brine.

Filling-groove (Moehring argand lamp). H, figs. 849-50.

Filling-piece (for door-post). 35, fig. 186. Any piece of

timber which has no other structural purpose than to close a gap.

**Filling-tube** (Moehring argand lamp). **I**, fig. 849-50.

**Filling-valve** (Pintsch gas-lighting apparatus). **A**, fig. 812, also figs. 818-19. More properly, *recipient filling valve*, which see.

**Finger-plate** (Wolfrath sash-lift and lock). **N**, figs. 1700-2. Corresponds to the *trigger* of a sash-lock, which see, and subserves the same end, but is connected with the sash-lift.

**Finishing varnish** (painting). An elastic (oily) varnish applied in two coats. The first is allowed at least 48 hours to dry. The second and fuller coat of the same varnish is then applied and the car is kept out of the sun, but exposed to the air for a number of days. A first-class job can be turned out in 12 or 15 days, hardly in less time if a durable finish is desired. Additional time between coats will give additional safety. See *Painting*.

**Fire-box** (Gouge heater). **52**, figs. 1413-4, etc. The various parts are the top, bottom, two ends, back lining, back of heater-case, etc.

**Fire-chamber** (Bissell heater). Figs. 1360-1401. More commonly termed in other stoves the *firepot*. It is in three parts, termed *top*, *middle* and *lower sections*.

**Fire-door**. 1. (Johnson heater.) **12-13**, fig. 1472. A *feed-door*, which see. There are two, *outside* and *inside*.

2. (Spear heater.) **17**, figs. 1486-90, 1502-5.

**Fire-door frame** (Johnson heater). **14**, fig. 1472. (Spear heater.) **18**, figs. 1486-90, 1504.

**Fire-extinguisher**. Fig. 1044. See *Babcock fire-extinguisher*.

**Fire-guard**, *front* (Johnson heater). **8**, fig. 1472.

**Fire-pot** (Baker heater). Fig. 1305; **4**, fig. 1301; (Gouge heater) **15**, figs. 1405-7; (Kohler stove) **A**, fig. 1474; (Spear heater) figs. 1498, 1519; **12**, figs. 1486-90; (Winslow heater) **B**, fig. 1536. Also called *fire-chamber*, *fire-box*, *furnace*, and sometimes *cylinder*.

**Fire-proof bottom** (Spear heater). Fig. 1524. A plate with circular corrugations, placed inside of the bottom-plate, on top of the floor.

**First-class car**. Figs. 48-9, 62-3. The ordinary American day coach used by the great bulk of short trip passengers. So called to distinguish it, on the one hand, from those of an inferior grade, as *emigrant* and (rarely) *second-class* cars, and on the other hand from *sleeping* and *parlor* cars

(which see), in which an extra charge, in addition to the ordinary fare, is made, and which are the true American first-class cars.

**First-class carriage** (English). Figs. 204 to 207. Nearest American equivalent, *parlor*, or *drawing-room car*. A coach for passengers paying the highest rate of fare. It is divided into four or more compartments, each about 7 feet cube, and seating six or eight passengers.

**Fish van** (English). A covered vehicle adapted to run on passenger trains, and fitted to carry fresh fish in crates or boxes. When without a roof it is termed a *fish truck*.

**Fittings**. Figs. 696-1707. *Furnishings*, which see.

**Five-group spiral spring**. Figs. 2078-2099. See *Spiral spring*.

**Fixed brake-lever**. **5**, figs. 338-9, etc. More commonly, *dead-lever*. A brake-lever, the upper end of which is fastened to a brake-lever stop or dead-lever guide.

**Fixed or stationary freight-car lock**. Figs. 1014-7, 1108-9. A lock which is attached to the side of a car. The bolt or hasp is fastened to the door.

**Fixed grate** (Gouge heater). **2**, fig. 1407. A square grate with a large circular opening for the *movable grate*.

**Fixed hanger** (bell-cord). Figs. 732-3, 742. See *Bell-cord hanger*.

**Fixed ratchet** (in Morgan's deck-sash pivot). Figs. 161 21. The piece attached to the side of the window frame with which the sash-ratchet engages, the latter being pressed against it by a spring.

**Flag-holder** (for corner-post of passenger car). A cast or malleable iron receptacle for a signal-flag staff. It has a lug cast on it which engages into a *flag-holder plate* attached to the corner-post. See also *Coolbaugh's lantern and flag-holder*, figs. 967-8, and *tail-light*.

**Flag-holder plate**. **161**, figs. 169, 179, 181. See below.

**Flange**. 1. (Of bell-cord guides, etc., etc.) Figs. 720-24. A projecting rim for attaching the part to any surface by wood screws.

2. (Of a car-wheel.) **26**, fig. 2002. A projecting edge or rim on the periphery for keeping it on the rail. The inside edge of the flange which connects with the tread of the wheel is termed the *throat*, and the extreme outer point the *toe* of the flange. Worn flanges having flat vertical surfaces extending over  $\frac{1}{4}$  inch from tread of wheel, or less than 1 inch thick, are a cause for rejection



under the rules for interchange of traffic. The standard distances fixed by the Master Car-Builders' Association, from outside of flange to inside of tread in surface, is 4 feet 5½ inch, as shown in fig. 1996. See *Flange gauge* and *flange and journal gauge*. See also *Wheel-centre flange*, **G**, fig. 2167.

**Flange and journal gauge**. Fig. 2123. One of the M. C. B. standard gauges, for testing the centering of the wheel, wear of flange, etc.

**Flange hrake-shoe**. Figs. 247-8. See *Ross flange brake-shoe*.

**Flange-collar** (of a passenger-car door lock). **C**, fig. 1005.

**Flange-gauge**, or *distance-gauge*. Fig. 1996. A gauge for determining the correctness of the distance between inside and outside of flanges. The dimensions shown in the engravings are those adopted as standard by the M. C. B. Association.

**Flange-lip**. 1. (Atwood's hemp-packed wheel.) **E**, fig. 2167. A dove-tailed projection on the wheel-center entering into a corresponding groove in the tire to hold on the flange in case of accident, but otherwise sustaining no strain.

2. (Ross flange brake-shoe.) **B**, **C**, fig. 247.

**Flanger**. See *Snow flanger*.

**Flap-door** (English). See *Falling-door*.

**Flashing** (Lorenz refrigerator car). **T**, figs. 130-130½. "Plumbing. A lap-joint used in sheet-metal roofing, where the edges of the sheets meet on a projecting ridge. A strip of lead leading the drip of a wall into a gutter." —*Knight*. Hence extended to mean any strip of sheet-metal of an L-section used to make a water-tight joint.

**Flat-bar spiral-spring**. Figs. 2061-77. One made by winding a flat bar flatwise, in distinction from *edge-rolled*, which is a similar bar wound edgewise.

**Flat-car**. Figs. 13-14, etc. A car, the body of which consists simply of a platform, which is not inclosed on the sides or top. If sides are added it becomes a *gondola car*. See *Car and freight car*.

**Flat or oval coupling-pin**. Figs. 444-5, 426-7. See *Coupling-pin*.

**Fletcher journal-hox lid**. Figs. 2019-20. A flat plate held down by a spring at the pivot. The drawings given are somewhat in error. There is a sleeve washer which fits in over the pivot-bolt to afford a bearing for the nut,

and no pin is used to hold the latter in place, as represented.

**Flexihle car window-blind** (Wilson's, which see). Figs. 1645-7, 185a. The *Paul flexible window-blind* is another style accomplishing the same end in a different manner. It uses slats with alternate concave and convex edges, united by a strip of spring-brass. A pair of spring-brass wires connect the slats in the middle.

**Flexihle frame** (logging and other cheap cars). Figs. 1729-30. A frame so constructed that the natural spring of the wood may serve in part as an equivalent for metallic springs, the latter being dispensed with. Many narrow-gauge freight use *spring end-sills*, which see, in a similar manner.

**Flexihle-top seat-cushions**. Figs. 1205-7, 1212-13. A seat-cushion, the top of which is in detached parts so that one part can yield without carrying down the other.

**Floating connecting-rod** (Hodge brake). **8**, fig. 235. A horizontal rod which connects the two floating-levers together.

2. (Westinghouse brake.) **8**, fig. 325. A rod which connects a cylinder-lever with a floating-lever.

**Floating-lever** (Hodge brake). **7**, fig. 235; **12**, fig. 325. One of two horizontal brake-levers which are used under the centre of a car-body. They are each connected at one end with one of the brake-levers on the truck, and at the other end with the brake-windlass. The centres of the floating-levers are connected together by a rod called a *floating connecting-rod*.

2. (Westinghouse freight brake.) **4**, figs. 338-9; fig. 349. A lever, to the middle of which the *push-rod* is attached, each end being connected directly to the *live-lever* of each truck.

**Floating-lever connecting-rod** (Westinghouse freight brake-gear). **16**, figs. 338-9. More properly *floating connecting-rod*, which see.

**Floor**. 1. "That part of a building or room on which we walk; the bottom or lower part consisting, in modern houses, of boards, planks, or pavement.

2. "A platform of boards or planks laid on timbers as in a bridge or car; any similar platform."—*Webster*.

3. **27**, figs. 82-185. The boards which cover the sills of a car. In passenger cars the floor always consists of two and sometimes three courses of boards, called re-

spectively the *flooring*, *intermediate floor* and *deafening ceiling*, the latter being on the under side of the sills. An intermediate, or *upper floor*, more commonly called the *double-deck*, is used in stock cars for carrying sheep and hogs. Hopper-bottom cars have an *inclined floor* subdivided into inclined *end-floor* and *side-floor* when both are used, which is not usual. This floor is now often made of iron plates called *hopper-plates*.

**Floor air-inlets** (Lorenz refrigerator car). **F**, figs. 130-130½.

**Floor-beam.** A *sill*, which see.

**Floor blocking-strip** (box cars). **205**, figs. 97-101. A strip of approximately triangular section nailed between the posts along the floor, to which the inside lining is attached.

**Floor-frame.** The main frame of a car-body underneath the floor, including the sills, body-bolsters, needle-beams, etc. In England called the *under-frame*.

**Floor-furnishings.** Figs. 802-811.

**Flooring.** Tongued and grooved (which see) boards of which a passenger car floor is made. The floor of freight cars is commonly two-inch *planking*.

**Floor-mat.** Figs. 806-7. A texture or structure of hemp, cocoa-fibre, rattan, india-rubber, wood or other material, laid on the floor of a car for passengers to clean their boots and shoes on. Mats are placed on the floors of street cars to take up the dirt and dust. See *Cocoa-fibre*. *Wood floor-mat*. *Rubber floor-mat*. The latter are either *perforated* or *corrugated*.

**Floor-pipe** (for closet-hoppers). Figs. 1087-89. A pipe passing through the floor of the car only, with which the hopper proper is connected.

**Floor-stop.** 1. (For door-holder.) Figs. 764-778. A catch for a door-holder attached to the floor, in distinction from a *partition-stop* attached to the wall or partition. See *Door-holder*.

2. (Grain-door.) **g**, fig. 378.

**Floor-timbers.** **3**, **4**, figs. 82-92, 102-8, 142-3, 155-85; **10**, figs. 1843-6. The main timbers in the frame of a car-body underneath the floor, and on which the latter rests. They are chiefly the *sills* (side, centre and intermediate) and the *end-sills*. The English term is *under-frame*. See also *Diagonal floor-timber*. *Inclined floor-timber*. *Transverse floor-timber*.

**Floor-timber braces.** **8**, fig. 103; **7**, figs. 170, 182. Diag-

onal timbers let into the sills under the floor to stiffen the floor-frame laterally.

**Floor-timber distance-block.** **7**, figs. 106-7, 143; **5**, figs. 170, 182. A short transverse piece of timber placed between adjoining floor-timbers and sills to stiffen them, the whole being fastened together with bolts. The floor-timber distance-blocks sometimes (as **A**<sub>8</sub>, fig. 122) constitute collectively in connection with a *cross-frame tie-bolt* a substitute for a cross-frame tie-timber or needle-beam for stiffening the floor of the car. In iron frame cars, *tie-plates* are riveted across the top of the sills to subserve the same purpose, as **C**<sub>2</sub>, fig. 147.

**Floor-traps** (refrigerator car). **M**, figs. 130-130½.

**Floor-tubes** (Gouge heater). Fig. 1439. Small tubes through the bottom of the *running-pipe* and floor at **66**, fig. 1470, to prevent dust accumulating in the running-pipes.

**Flue** (suspended heater). **E**, figs. 1529-32. For hot air. See *Hot-air pipe*, etc.

**Flush bolt.** Figs. 761, 997. A bolt attached to a slide which is let into a door, sash, or window, so as to be flush with its surface. A *spring* flush-bolt is commonly called a *cupboard-catch*.

**Flush-bolt keeper.** **A**, fig. 997, etc. A plate which is attached to a door, sash, or window frame, and has a suitable hole in which a flush-bolt engages. When for spring-bolts, as in the engraving, they are also called *strike-plates*.

**Flush-catch.** Figs. 1628-9.

**Flush-handle.** Figs. 990, 996, 746, 761. A handle for a lock or latch which is placed in a recess, as of a door, sash, or berth, and which does not project beyond the surface of the object to which it is attached.

**Flush sash-lift.** Fig. 1667. A metal plate with a recess, to take hold of, which is let into a sash so as to be flush with its surface.

**Fluted-glass lamp-reflector.** Fig. 844. A cheap reflector for street and narrow-gauge cars.

**Fogg's upper-berth hinge.** Fig. 1240. See *Berth-hinge*.

**Folding arm-rest, or elbow-rest** (English). **198**, figs. 204, 205, 206. A wooden support for the elbow, upholstered on both the upper and lower sides, and fitted with a spring hinge, so that it can be turned up to lie flat against the back of the seat, in order to allow a passenger to lie down at full length on the seat.



**Folding-side gondola car.** A gondola car, the sides of which are attached with hinges, so that they can be folded up or down.

**Follower.** 1. A very common abbreviation for a *follower-plate*, which see.

2. (For grate, Johnson heater.) 17, fig. 1472. A plate to prevent escape of dust when shaking the grate, by keeping the opening closed.

3. (Janney coupler.) 113, figs. 542-54. A drawbar follower-plate.

4. (Janney-Miller coupler.) 99, figs. 542-554, 602-35. A drawbar follower-plate.

5. (Pistons, which see.) A common abbreviation for the *follower-plate*, which holds on the packing-rings of a piston.

**Follower-bolt.** A *piston follower-bolt*. See *Piston*.

**Follower-guide** (Janney-Miller coupler). 100, figs. 542-554, 602-35. (Logging cars.) Fig. 1777. A *drawbar guide*, which see.

**Follower-lug.** Fig. 1742. A *drawbar stop*, which see.

**Follower-plate.** See *Buffer-spring follower-plate*. *Drawbar follower-plate*. *Piston follower-plate*. The word "plate" is commonly omitted from these names.

**Follower-plate block, or buffer-spring block** (Hoit double-spring draw-gear). 1, figs. 426-7; 183, figs. 113-5. A wooden cross-piece in front of the *double-spring drawbar timbers*, against which the *buffer-spring follower-plate* abuts.

**Foot-board.** 1. (Freight cars.) See *Brake-step*

2. (English) (*upper* and *lower*). 172, figs. 205-207. American equivalent (street cars only) *longitudinal step*. Two continuous steps running along the sides of a *carriage* or *brake van*, the *upper* a short distance below the doors, and slightly above the level of highest station platform; the *lower* about 18 in. from the rail level. They form steps and prevent any person falling between the train and the platform. American *excursion cars*, which see, fig. 49½, have a single foot-board, often so called.

**Foot-board bracket.** See *Brake-step bracket*.

**Foot-plate** (Janney coupler). 7, figs. 542-554. A cast-iron wearing plate on the upper side of the passenger platform nosing or end rail.

**Foot-rail.** 127, fig. 158; 7, figs. 1122-4. A horizontal wooden bar underneath a car-seat for the passengers who

occupy the next seat to rest their feet on. These fixed foot-rails are often called *foot-rests*, as in old edition of this dictionary, but such use is confusing, since the term *foot-rest*, which see, is applied to many forms of adjustable foot-rests. See *Side foot-rest*.

**Foot-rest.** 1. 8, fig. 1120. Any *movable* support for the feet of passengers, especially two horizontal wooden bars underneath a car-seat, and attached to two iron rockers called *foot-rest carriers*, pivoted in the centre so that it can be adjusted to a comfortable position for the passenger occupying the next seat, or moved out of the way, if desired. Another style is an *adjustable foot-rest*, fig. 1194, sliding on rabbit pieces. A portable stuffed carpet foot-rest is usually termed an *ottoman*, fig. 1164.

2. (Hartley chair.) 2, figs. 1154-8. An extension of the chair, consisting of two leaves, front and back, carried within the *foot-rest frame* and supported from below by a *foot-rest carrier*. The latter is in the form of the arc of a circle, and its position is regulated by the *adjusting-lever* 15. Some of the chairs also carry a *back foot-rest* 5 and 6, fig. 1157, for the benefit of the occupant of the chair in the rear.

**Foot-rest carriers.** 9, figs. 1120-53. See above.

**Foreign car.** Any car not belonging to the particular railroad on which it is running, including *line cars*, which see. By the established rules for interchange of traffic all such cars are, or are supposed to be, inspected before entering on the lines of a foreign corporation, and "if an accepted foreign car is injured upon a road it shall be repaired by and at the expense of the company in possession thereof as promptly as it repairs its own cars." The cost thereof is sometimes charged to the owner of the car and sometimes not, according to an elaborate system of rules revised annually.

**Forked hanger** ("American" horizontal-cylinder driver-brake). 7, figs. 358-9. The suspending-link for the brake-blocks.

**Foster rim night-latch.** Fig. 1026. A night-latch somewhat similar to the *Yale lock*, which see.

**Fount.** See *Lamp-fount*.

**Four-place boudoir** (Mann boudoir sleeping car, which see) Fig. 680-1.

**Four-way cock** (triple valve, which see, of Westinghouse brake). Figs. 326, 332-3. A tapered conical spindle, with two passages in it which form a faucet for opening and

closing communication between the brake-cylinder, reservoir and brake-pipe.

**Four-wheel car.** Figs. 4, 19, 23, 41-2, etc. The original type of railway vehicle, still almost universal in England and on the Continent, and very largely used in this country for coal cars, and to some small extent for box cars and gondola cars. The truck of an ordinary American eight-wheel car is simply a four-wheel car carrying half the weight of the car-body as a dead load upon it.

**Four-wheel trucks.** Figs. 1907-68.

**Frame.** 1. The outline or skeleton upon which a structure is built up. In a car the framing is usually supposed to mean the side frame as distinguished from the floor-frame, unless otherwise so expressed. The leading types of freight-car frame are shown in figs. 84, 89, 93, 97, 121, etc. See *Bastard Howe*. *Bastard Pratt*. The leading styles of passenger car framing are shown in figs. 155, 177, 159 and 64-5, and also in perspective view, fig. 186. The plan of floor-framing, fig. 648, is wholly special to street cars. An example of the increasing use of iron in framing is the *Challender truss*, fig. 185b, which is a plate girder taking the place of the ordinary truss-rods, body-braces, truss-planks, etc.

2. (Of a door, ventilator, window-sash, mirror, etc.) The rectangular or curved border surrounding or inclosing it.

See <i>Berth-spring frame.</i>	<i>Lever-frame.</i>
<i>Continuous truck-frame.</i>	<i>Match-striker frame.</i>
<i>Cushion-frame.</i>	<i>Mirror-frame.</i>
<i>Door-frame.</i>	<i>Name-panel frame.</i>
<i>End-frame.</i>	<i>Register frame.</i>
<i>Fire-door frame.</i>	<i>Signal-bell frame.</i>
<i>Grate-frame.</i>	

**Framed spring-plank.** Fig. 2029. A spring-plank composed of several different pieces framed together.

**Franklin Institute system of screw-threads.** The *Sellers* system of screw-threads, which see, is often called the Franklin Institute system because the former was first proposed in a report to, and was recommended by, the Franklin Institute.

**Freight barrow-truck.** Figs. 1903, etc. More commonly supply *freight-truck*, which see. See also *Barrow-truck*.

**Freight car.** Figs. 1-42, 82-143. A general term used to designate all kinds of cars, which carry goods, merchandise, produce, minerals, etc., to distinguish them from

those which carry passengers. English term, *wagon*. Figs. 116-19.

The cost of various styles of freight cars, as established by the rules for interchange of traffic, has varied in different years as follows :

	1884.	1883.	1882.	1881.	1880.	1879.
Eight-wheel box car, 32 to 35 ft.	\$500	\$520	\$575	\$575	\$450	\$425
“ “ box car, 32 ft. or under	480	500	550	550		
“ “ stock car, 32 ft. or over	500	520	....	....	....	....
“ “ stock car, 32 ft. or under	470	490	550	550	450	....
“ “ gondola car, 20-ton, drop-bottom	430	450	525	525	375	....
“ “ gondola coal-car, 20-ton, hopper-bottom	505	525				
“ “ gondola, 31 ft. or over	380	400	....	....	....	....
“ “ ordinary gondola, less than 31 ft.	355	375	475	450	....	....
“ “ ordinary flat car, 31 ft. or over	340	360	460	460	....	....
“ “ ordinary flat car, under 31 ft.	330	350	425	425	350	....
Four-wheel gondola car, with truck and drop-bottom	305	325	350	350	....	....
“ “ box car	230	250	300	300	250	....
“ “ ordinary coal car	205	225	250	250	225	....
One pair four-wheel trucks	222	230	275	275	225	210

For varieties of freight cars, see *Car*. For lettering (which see) of freight cars, see figs. 658-63.

**Freight-car bell-cord guide.** Fig. 716. Bell-cords are not, as a rule, used at all on freight cars.

**Freight-car lock.** Figs. 1011-18, 1108-9. A lock for fastening the doors of freight cars. The usual freight-car lock is a simple padlock with seals, but *stationary* or *fixed freight-car locks* are in increasing use.

**Freight-car trucks** (diamond type, which see). Figs. 1907-40. (Miscellaneous types.) Figs. 1941-53.

**Freight-house truck.** Figs. 1898-1906. A *freight truck*, which see. See also *Barrow-truck*. *Wagon-truck*.

**Freight-train brake** (compression). Figs. 368-9. See *Compression brake*. *Brake-gear*. (Westinghouse.) Figs. 336-357. See *Westinghouse brake*.

**Freight-truck.** Figs. 1903-6. A two-wheeled vehicle, universally used about stations for loading and unloading freight. A *baggage-barrow* is much the same. Baggage-barrows and freight-trucks are both sometimes designated as freight or baggage *barrow-trucks*. See *Freight barrow-truck*, figs. 1903-6. *Freight wagon-truck*, fig. 1899. *Push baggage-car*, fig. 1713.

**Freight wagon-truck.** Fig. 1899. A four-wheeled vehicle for moving freight by hand.

**Fresnel lantern.** Fig. 986. A lamp inclosed in a cylin-



drical Fresnel lens, which see. They are more used in marine than in railroad service.

**Fresnel lens.** Figs. 957-8. A lens formed of concentric rings of glass or other transparent substances, one or both sides of which are bounded by spherical surfaces. The object of making a lens in this form is to reduce its thickness in the centre, and thus lessen the liability of having flaws and impurities in the glass, and also to reduce the absorption and aberration of the rays which pass through it. Such lenses are also made of a hollow, cylindrical form, and used to inclose signal lamps. The outside of the glass is formed of successive rings, the external surfaces of which are bounded by spherical surfaces.

What is known to the trade as a *semaphore* lens is a Fresnel lens with the inner surface concave.

**Friction-block.** See *Swing-hanger friction-block*.

**Friction-plate.** The body and truck *side-bearings*, which see, are sometimes called friction-plates. See *Chafing-plate*. *Drawbar friction-plate*.

**Friction-roller.** A wheel or pulley interposed between a sliding object and the surface on which it slides to diminish the friction. See *Car-door hanger*, figs. 791-801. *Sliding-door friction-roller*.

**Frieze.** That portion of a passenger or street car body on the outside, between the cornice or eaves of the roof and the tops of the windows. The *letter-board* occupies this space.

**Frieze-ventilator.** 141, fig. 155; figs. 1272, etc. See *Ventilator*.

**Frieze ventilator-plate.** Figs. 1562-3. A perforated metal plate placed on the outside of a frieze-ventilator to exclude rain and cinders from the car.

**Frieze ventilator-register.** Figs. 1553, 1272, etc.

**Front.** See *Ash-pit front*. *Alcove-front*. *Water-alcove front*.

**Front cylinder-head** (Westinghouse brake). 5, figs. 329-331, 354. For convenience of designation, the end of the cylinder opposite to the piston-rod is called the *front* end, and that adjoining the piston-rod, the *back* end, as in locomotives.

2. (Westinghouse tender brake.) 5, figs. 307, 330.

**Front face-plate** (steel-tired wheels, which see). Figs. 2163-71, etc. See *Face-plate*.

**Front fire-guard** (Johnson heater). 8, fig. 1472.

**Front hot-air pipe** (Gouge heater). 9, figs. 1405-7.

**Front-lining** (Gouge heater). 61, fig. 1410. A part used to make the double air-chamber that protects the front of case.

**Front of case** (Gouge heater). 87, fig. 1412. See above.

**Front-offset** (Gouge heater). 85, fig. 1409.

**Friction-washer** (lower and upper) (of swing link-hanger, which see). 3 and 7, figs. 2110-1.

**Front-rest** (for cross-bar of Gouge heater). 8, fig. 1444.

**Front seat-bottom rail** (street cars). 37, figs. 1843-6. See *Seat-bottom rail*.

**Front seat-rail** (street cars). 36, figs. 1843, 1844.

2. (English.) 104, figs. 204, 205, 206.

**Fruit car.** Figs. 121-5. A car of special design for the carrying of fruit and other perishable products requiring ventilation. The ventilators are so arranged that they can be opened and closed while the car is in motion, so that there may be a constant stream of fresh air passing through the car. Ice is not used. They are fitted with the Miller platform and Westinghouse air-brake, being run largely in passenger trains or at passenger speed.

**Fulcrum.** 1. "In mechanics, that by which a lever is sustained, or the point about which it moves."—*Webster*. See *Brake-lever fulcrum*.

2. (For propelling-lever of hand-car.) 6, figs. 1724-6.

**Fulcrum-bolt** (Janney platform). 12, figs. 542-554, 555-601. The bolt passing through a *fulcrum ferrule* in the knee-timber and forming the fulcrum upon which the *yoke-lever* works.

**Fulcrum-ferrule** (Janney platform). 35, figs. 542-54, 555-601. See above.

**Funnel.** 1. "A vessel for conveying fluids into close vessels: a kind of inverted hollow cone with a pipe: a tunnel."—*Webster*. See *Filling-funnel*. *Poke-hole funnel*.

2. (Bissell beater.) Fig. 1403. The cast-iron conical sheet between the ash-box and the grate. The lower section of the *fire-chamber* fits on to it.

**Furnace** (suspended heater). A, figs. 1529-32. The part ordinarily known as *fire-pot* or *fire-chamber*, which see.

**Furnishings.** Figs. 696-1707. A term designating the smaller fixtures, hardware, etc. The engravings are alphabetically classified as follows:

*Basket-racks*, *bell-cord*, *door* (bolts, springs, etc., door stops, hinges, sliding-door fixtures), *floor*, *gas fixtures*,

*lamps* (centre lamps, side lamps), *lamp-burners*, *lamp chimneys and shades*, *lanterns*, *locks*, *miscellaneous*, *mouldings*, *postal-car*, *saloon*, *seals*, *seats* (parlor-car chairs, seat-arms, etc., seat-ends and mouldings, upholstery details), *sleeping-car stoves and heaters* (Baker, Bissell, Gouge, Johnson, miscellaneous, ranges and cook-stoves, Searle, Spear, suspended heater, Winslow), *table*, *ventilators*, *wash-room*, *water-coolers*, etc., *window* (deck sashes, lower windows).

Of the above list, it might be questioned whether mouldings and stoves or heaters would be ordinarily classed as furnishings, though so classified for convenience.

**Furniture car.** An extra-sized box car. Usual dimensions about 34 ft. over end-sills, 9 ft. 4 in. over side-sills, 7 ft. 6 in. from top of sills to under side of plate. More particularly designed for carrying furniture and made extra large.

**Furring.** 59, figs. 155-85; 12, fig. 186. Pieces of wood placed in a wall or other position to nail something to, as a panel or moulding. See *Panel-furring*.

**Furring-blocks.** 12, fig. 186. See above.

**Fusee.** The cone or conical part of a watch or clock, round which is wound the chain or cord. It is a very ancient mechanical contrivance, and is made of a cone form in order to equalize the power of the spring, the leverage of the cord increasing as the resistance of the spring increases, and *vice versa*. Fusees are shown in figs. 1249 (*berth-spring fusee*) and 1703.

## G

**Gagger.** A *chaplet*, which see.

**Gain.** "In architecture, a beveling shoulder, a lapping of timbers, or the cut that is made for receiving a timber." —*Webster*. In car work the term generally means a notching of one piece of timber into another. *Boxing* is almost a synonymous term. The timbers are *boxed out* in order to *gain* them into each other. A *mortise*, which see, is usually deeper and does not extend clear across the stick.

**Galvanized iron.** Sheet iron coated with zinc by immersing it in a bath of the liquid metal covered with sal ammoniac, after first cleaning it in a bath of dilute acid. An amalgam of 11.5 zinc and 1 mercury is sometimes

used. It is usually made in sheets about 2 feet wide by 6 to 9 feet long, and its thickness measured by its number, wire-gauge (W. G.). See *Kalaminated iron*.

**Gardner's geared seat-arm.** Figs. 1131-1142-3. A device for giving a backward slope to car-seats with reversible backs by a rack and pinion movement in the seat-arm and seat-arm pivot. Several other devices for the same purpose exist. See engravings.

**Garnish rail** (English). 111, figs. 204-6. A horizontal piece of ornamental wood curved on the upper surface and placed on the inner side of the mouth of the slot into which the movable window falls. It carries the *glass string roller*, which see.

**Gas-burner.** "The jet-piece of a gas-lighting apparatus at which the gas issues and combustion takes place." —*Knight*. A system of gas burning is in use on the Pennsylvania Railroad by compressing ordinary city gas. Another and more elaborate system is the *Pintsch*, which see, figs. 812-27.

**Gas-pipe.** See *Pipe*.

**Gas-pipe fittings.** Figs. 1327-48, etc. See *Pipe-fittings*.

**Gas-tube** (sun burner). Fig. 886. A safety device for conducting to the flame and utilizing for light the volatile products evaporated by the heat of the burner.

**Gasket.** "A strip of leather, tow, or textile fabric, to form a packing or calk a joint." —*Knight*. The term is also applied, probably with perfect correctness, to sheets of lead, copper, etc., used for the same purpose. The Westinghouse engine and air-pump gaskets, 36-41, figs. 293-9, etc., are copper. A peculiar gasket or packing-ring of rubber faced with lead to prevent the gas injuring the rubber is used in all joints of the Pintsch gas apparatus, figs. 824-5.

Gaskets take their name from the parts which they are used with.

**Gasolier.** A recent attempted addition to the English language signifying a chandelier burning gas. It is unauthorized by good usage.

**Gate.** 1. See *Platform-gate*.

2. (Of a casting-mould.) The opening through which the melted metal is poured. Also called *Ingate*.

**Gauge.** 1. (Of track.) The distance in the clear between the heads of the rails of a railroad; 4 ft. 8½ in. is the *standard gauge*; if greater than this, a *broad gauge*, which see; if smaller, a *narrow gauge*, which see.



*Wide gauge* usually means a minor and irregular or exceptional enlargement of a given fixed gauge, in distinction from *tight gauge*, a corresponding construction.

2. A tool or instrument used as a standard of measurement of pressure or size.

See *Air-gauge*.

*Cylindrical-gauge*.

*Pressure-gauge*.

*Screw-gauge*.

*Screw pitch-gauge*.

*Screw-thread gauge*.

*Wheel and axle gauges*.

*Whitworth-gauge*.

**Gauze.** See *Wire-gauze*.

**Gear.** 1. Apparatus: In mechanics the term is used to designate a combination of appliances for effecting some result, as *valve-gear*. See *Brake-gear*. *Draw-gear*. *Swing-motion gear*.

2. Wheels are said to be *in gear* when they have cogs interlacing.

**Geared seat-arm.** Figs. 1131, 1142. See *Gardner's geared seat-arm*.

**Gear-wheel.** 5, figs. 1720-3; 9, figs. 1724-6, etc. Any cogged wheel is a gear-wheel, but the term is usually restricted to the larger one of two cog-wheels in gear, the lesser one being called the *pinion*. The *gear-wheel* is also called *spur-wheel*.

**Gelatinized fibre.** Another name for *vulcanized fibre*, which see.

"**Gem**" door-spring. Fig. 757. See *Door-spring*.

**Gib** (for journal-bearings). Figs. 1982-92. A *journal-bearing key*, which see. This word should not be pronounced *jib*. The *g* has the hard sound.

**Giband key.** A fastening to connect a bar and strap together by a slot common to both, in which a C-shaped *gib* with a beveled back is first inserted and then driven fast by a taper *key*.

**Gibson fastening** (English). Fig. 2155. As applied to railroad wheels, one of the earliest applications of the principle of securing a tire to a wheel by means of clips instead of bolts, studs or rivets. The clip shown on the right hand of the figure is not continuous and is kept in place by hammering over the lip of the groove in the tire. This method is being superseded by better modes of *tire fastening*, which see.

**Gifford car-coupler.** Figs. 416-17, 515-6. One of the couplers mentioned as worthy of further trial by the M. C. B. Association. It is in use on the New York, Lake Erie & Western and other railroads on a large number of cars.

The principle of the coupler is the use of a rectangular beveled pin which is automatically driven upward by the action of an ordinary link in coupling and operates much the same as a common pin. It does not dispense with a loose link of common form.

**Gimlet-pointed screw.** The common *wood-screw*, which see, of carpentry and joiner work, having its screw cut to a point like a gimlet so that it can force its own way into wood.

**Girder.** "In architecture, the principal piece of timber in a floor. Its ends are usually framed into the summers, or breast-summers, and the joists are framed into it at one end. In buildings entirely of timber, the *girder* is fastened by tenons into the posts."—*Webster*.

"The term *girder* is restricted to beams subject to transverse strain, and exerting a vertical pressure merely on their points of support."—*Stoney*. The term is almost synonymous with *truss*. Thus, engineers speak of a "Howe *truss*," a "Pratt *truss*," a "Warren *girder*," and a "lattice *girder*." The distinction is that a *truss* consists of separate parts held together by pins, or even simply by pressure, which may be taken down and re-erected; whereas a *girder* is a single solid structure, either all one solid piece (*rolled girder*), or of plates riveted together (*plate girder*), or of combined plates and riveted lattice work (*lattice girder*).

**Girth.** 49, figs. 82-92, 132-8. A long horizontal piece of wood on the side of a box-car body fitted to the posts and braces so as to embrace them, placed about half-way between the floor and the roof. The *end-girth* is a similar stick across the end of the car. The inside lining reaches up to the girth.

**Girth tie-rod.** A horizontal rod extending from the door to the corner-post along the girth of a freight-car and intended to tie the two posts together.

**Gland.** 4, fig. 365, etc. A cover of a stuffing-box, as for a piston-rod, etc. See *Piston-rod packing-gland*.

**Gland-nut** ("American" steam brake-valve). 5, figs. 360-2. See above.

**Gland spanner-nut** ("American" steam driver-brake). 5, figs. 363-5. See *Spanner*.

**Glass.** See *Window-glass*. *Cut-glass*. *Sand-blast*.

**Glass-frame bottom sash-rail** (English). See *Door-light bottom sash-rail*.

**Glass-frame stile** (English). See *Door-light stile* and *quarter-light moulding*.

**Glass-plate guide** (seal-lock). **D**, fig. 1011.

**Glass seal** (seal-lock). **B**, figs. 1011-18.

**Glass-string, or glass-strap** (English). **204**, fig. 205. A leather strap by which the window in the door of a carriage is raised or lowered. The strap is pierced with a number of holes which fit a small brass or ivory knob placed on the door immediately under the *glass-string roller*, which see.

**Glass-string roller** (English). **195**, fig. 205. In a carriage, an ornamental roller attached to the upper edge of the *garnish-rail* in a door. The leather strap (*glass-string*) by which the window is raised and lowered passes over this roller.

**Glass water-gauge**. A gauge consisting essentially of a vertical glass tube connected at top and bottom with a boiler so as to make the height of water therein visible. For *Johnson heater*, see fig. 1472.

**Globe**. See *Adjustable globe*, *Lamp-globe*,  
*Fast lamp-globe*, *Loose-globe*.

2. (Of Pintsch gas-burner.) Fig. 816. A globe of hemispherical form, admitting air only from the top. It is an almost universal type of car lamp-globe in Europe.

**Globe-chimney**. Figs. 948-53. A *lamp-globe chimney*, which see.

**Globe-holder**. **7**, figs. 828-68; for *lantern*, fig. 978. Any contrivance for holding a globe on a lamp. Usually it consists of a metal ring, at the base of the globe, on which the latter rests, and to which it is fastened with springs, screws, or by the pressure of the globe-chimney on top when the latter is adjustable. See *Adjustable* and *Detachable globe-holder*.

"**Globe**" lamp-shade or lamp-globe. Fig. 948. See *Lamp-shade*.

"**Globe**" ventilator. Figs. 1558-9. A ventilator of spherical form, with annular openings, which produces an induced exhaust current in whatever direction a current of air strikes against it.

**Glue**. A preparation from the hoofs, horns and hides of animals, washed in lime-water, boiled, skimmed, strained, evaporated, cooled in moulds, cut into slices and dried upon nets. If good, it is a hard cake, of a dark but almost transparent color, free from black or cloudy spots and with little or no smell. The more transparent and

amber colored the better. Inferior glue made from bones will almost entirely dissolve in cold water; other kinds are contaminated with lime. Glue is better for remelting. The strength of glue for common work is increased by adding a little common chalk.

**Glue size**. One pound of glue in a gallon of water. *Double size* has about twice this quantity of glue. *Patent size* is a kind of gelatine.

**Gondola car**. Figs. 15-36, 113-5. A flat car inclosed with low *side-plank*, usually fixed, but sometimes hinged so that they can be let down, and in some cases removable. Four-wheeled gondola-cars, fig. 19, are somewhat used. *Hopper-bottom* gondola cars, figs. 16-18, are largely used.

**Gong**. A *signal-bell*, which see.

**Goods wagon** (English). Figs. 116-119. American equivalent, *freight car*. See *Wagon*.

**Goose-neck** (Eames coupling). **16**, figs. 280-1. A *brake-hose nipple* connecting the coupling-hose to the brake-pipe.

**Gouge "ventilator" heater**. Figs. 1405-71. One of the class of heaters relying on distribution of warm air, by pipes, through the car. It consists of a cast-iron *base* and a wrought-iron *fire-box*, fig. 1414, inside of which are two wrought-iron *radiators*. These parts, with the *injector-pipe* **56**, the front and back *hot-air pipes* **54** and **55**, the *deflector-pipe* **53**, and the *smoke-pipes* **58** and **59**, are inclosed in a galvanized-iron *case*, fig. 1412, through the top of which the *smoke-pipe* **58** is connected with the *smoke-head* **62** by the *connecting-joint* **78**. The *injector* catches the fresh air that is forced down by the motion of the car through the *injector-pipe* **56**, in which there is a valve **74-6**, to the base of the heater, where it passes into the *case*, and into contact with the heating surfaces. The heated air is then forced into the front and back *hot-air pipes* **54** and **55**, that supply the running-pipes, through the front and back offsets **85** and **86** (fig. 1409). The further course of the heated air can be traced in the engravings.

**Governor** (Westinghouse brake). **1**, fig. 316. See *Pump-governor*.

**Governor-block** ("American" automatic compression-brake, which see). **2**, figs. 368-9. A pair of cast-iron blocks pivoted at one end to the *axle-clamp* **1**, surrounding the axles, by the *governor-block*, *pin* and *key* **31**, and



controlled in their motion by the *governor-block spring* which tends to throw them inward. When centrifugal force is generated by the revolution of the axle, a pin on the extremity of the governor-blocks actuates the mechanism which throws the brake into gear.

**Governor-block spring and thimbles** ("American" automatic compression brake). 2, 3, 4, figs. 368-9. See above.

**Grab-irons.** 60, figs. 86-96; 102', fig. 93; figs. 656-7, etc. Also termed *corner-handles* or *ladder-handles* and *hand-holds*. The handles attached to freight cars for the use of trainmen in boarding the cars. They are often more definitely specified as *roof, side* or *end* grab-iron.

\* In a Committee report to the M. C. B. Association, 1883, it was recommended that "where ladders are on the end of the car a handle be placed horizontally about 24 in. above the lower edge of sill on side of car above the steps, to enable trainmen to get a firm hold before or while using the steps; also when the ladder is on end of car a handle should be placed on opposite corner from the ladder, and when ladders are on the side of car, two such handles should be placed on each end of the car about 24 in. above the bottom of sill, thus enabling train and yard men to sustain themselves while making couplings, and which would be vastly beneficial should they stumble or otherwise lose their footing."

This report was "received" by the Association, but no other action was taken.

The grab-irons or handles shown in figs. 656-7 are in the positions thus recommended.

The term *handle*, though often used to designate these attachments, is not strictly appropriate to such a part, nor is it so widely in use as grab-iron. See note to *handle*. Similar parts on passenger cars are called *hand-rails*, which see.

**Graduated spring.** Figs. 2095-2106. A form of compound spring of recent introduction, but of very wide and general use, in which only a certain number of the individual spirals come into action with a light load and the others only under a heavy load. Another method of accomplishing the same end, graduating the resistance of the spring to the load placed upon it, is the use of the *keg-shaped* or *spool-shaped* spring, figs. 2050-5. Under a load the part of larger diameter closes first and that of smaller diameter is much stiffer. These springs are much used on horse-cars, but rarely for steam-cars. Graduated springs have formerly been constructed by combining rubber and spiral springs, but are now exclusively spiral or combined spiral and elliptic.

**Graduating spring** (triple-valve of Westinghouse brake). 9, figs. 332-3, 353, 355-7. A spiral spring which acts against a collar on the graduating-stem to hold the

latter against the triple-valve piston when it is forced downward.

**Graduating-stem** (triple-valve of Westinghouse brake). 7, figs. 332-3; 10, fig. 353; 6, figs. 365-7. A slender rod or pin which works in a hole drilled in the centre of the triple-valve piston, and which, by the movement of the latter, opens and closes communication from the chambers above and below the piston.

**Graduating-valve** (of Westinghouse triple-valves). Figs. 332-3, 355-7. See above and *Triple-valve*.

**Grain-car.** A box car with tight inside *grain-doors*. Nearly all box cars are provided with them.

**Grain-door.** Fig. 3; 62, figs. 89, 93. A close-fitting movable door on the inside of a box car by which the lower part of the door-opening is closed, when the car is loaded with grain, to prevent the latter from leaking out. Such doors are usually made so that they can be thrown over on one side of the door-way, and thus be out of the way when they are not used. A great variety of mechanical devices are used for accomplishing this purpose, of which the *Susemihl & Miller grain-door*, figs. 373-6, and *Van Lieuw grain-door*, figs. 377-82, are shown with names of parts.

**Grain-door lock** (Van Lieuw grain-door). 6, fig. 380.

**Grain-door rod.** 63, figs. 89, 93. An iron rod attached to the door-posts on the inside of a box car, to which a grain-door is fastened or hinged. The door and rod are generally arranged so that the former can be moved to one side and out of the way when the car is not loaded with grain.

**Grate.** (Baker heater). 3, figs. 1301, 1304.

(Bissell heater). Figs. 1367, 1369.

(Gouge heater). Figs. 1407, 1416, 1452.

(Johnsou heater). 16, figs. 1472.

(Spear heater). 18, figs. 1490, 1506, 1528a.

A frame of iron bars for holding coals in a stove, fireplace, etc. It is usually capable of a sliding or rocking motion, or both, to clear away ashes and clinkers. See *Anti-clinker grate*. *Safety-grate*. In the Gouge heater it is distinguished as the movable grate, a rectangular fixed grate, fig. 1416, surrounding it.

**Grate-bar** (for Spear heater). 20, fig. 1490; fig. 1506. A cast-iron bar below the grate, and on which the latter rests.

**Grated-door.** A door consisting of a wooden frame with

iron or wooden bars, used on cars for carrying live-stock. Grated-doors are also shown in figs. 5-9, 23-4.

**Grate-follower** (Johnson heater). Fig. 1472. A plate attached to the grate-shank designed to prevent the exit of dust into the open air when the grate is shaken laterally.

**Grate-follower** (Johnson heater). 17, fig. 1472. See *Follower*.

**Grate-follower frame** (Johnson heater). 18, fig. 1472.

**Grate-frame** (Gouge heater). Fig. 1459. The frame for the rectangular fixed-grate.

**Grate-rest** (Gouge heater). Fig. 1461.

**Grate-ring** (Spear heater). 19, fig. 1490; fig. 1528*b*. A cast-iron ring which surrounds the grate.

**Grate-shaker** (Baker heater). Fig. 1320. An iron bar which can be attached to a grate to move it in shaking the fire.

**Grate-shank** (Johnson heater). 15, fig. 1472. The spindle on which the grate revolves and is supported.

**Grate-slide** (Gouge heater). Fig. 1445. A movable piece on the back of the cast front, fig. 1408*1*, in which the grate-shank works.

**Grating.**  
     See *Clinker grating.*      *Ventilator grating* (fruit  
     *Ice-box grating* (refri-      car).  
     generator cars).      *Window grating.*

**Gravel car.** A car for carrying gravel; usually either a *tip-car* or a *flat car*, the latter most used. They are often fitted with a central rail, over which a *ballast plow*, drawn by the locomotive after detaching it from the cars, works to unload the car.

**Grease axle-box** (English). 34, figs. 116-119 and 204-205. An axle box which is lubricated from above by a grease composed of tallow, soda and water, which is solid at ordinary temperatures and melts should the box get warm. This form is being superseded by the *oil axle-box*, which see.

**Grease-box.** A *journal-box*, which see.

**Grease-chamber** (English). 35, fig. 204 and fig. 219. A cavity above the journal-bearing which contains the lubricating material in a *grease axle-box*, which see.

**Grommet.** Figs. 802-804. "A ring formed with spliced rope (*Nautical*). The separate parts of any metallic eyelet are known as *grommets*. The two grommets, when compressed together (with a *setting-die*), form the *eyelet*.

**Ground glass.** Glass whose surface has been roughened by mechanical or chemical process so as to break up the light passing through it and destroy its transparency. Several processes exist; by the wheel, sand blast, rotating with pebbles, or by fluoric acid. The sand-blast is at present most commonly used.

**Group-spring.** Figs. 2067-88. A spiral car-spring formed of a number of separate springs, single or nested, united together by a common pair of *spring-plates*. It is called a *double*, or *two-group*, a *three-group*, *four-group spring*, etc., according to the number of separate springs.

**Guard.** 1. See

<i>Dash-guard.</i>	<i>Fender-guard.</i>
<i>Door-guard.</i>	<i>Heat-guard.</i>
<i>Draw-timber guard.</i>	<i>Lining-guard.</i>
<i>Dust-guard.</i>	<i>Mirror-guard.</i>
	<i>Window-guard.</i>

2. (English.) American equivalent, *conductor*. A railway official traveling with and having charge of a railway train. He unites the functions of the conductor, baggage-master, express agent and brakeman, but seldom collects or nips tickets, and never issues them, or receives fares. An *assistant guard* is sometimes but not always carried.

3. (For lanterns.) The exterior wire cover surrounding the *globe* and protecting it from accident. They are termed either *single*, *double* or *triple guard*, according to whether the number of horizontal wires. Figs. 974-5-8-9 have a single guard, and figs. 980-82 a double guard.

**Guard-band** (street cars). See *Door-guard band*.

**Guard-pipe** (Creamer brake, which see). 19, fig. 263.

**Guard-posts** (fruit car). Fig. 124. A row of posts standing inside of the ventilators and serving as a fender for the load packed within so as to prevent obstruction to the ventilators.

**Guard-rail gauge.** Fig. 2117. One of the M. C. B. standards. By resolution of the M. C. B. Association the standard distance between guard-rails to be assumed in fitting on wheels, was fixed at 4 ft. 5 in., out to out of head.

**Guard's van** (English). American equivalent, *caboose* or *baggage-car*. See *Brake van*.

**Gudgeon.** The bearing portion of a shaft, especially an upright wooden shaft. A rude journal bearing for slow motion. See *Screw-coupling nut and gudgeon*.

**Guide.** ¶ "That which leads or conducts."—*Webster*.

See *Bell-cord guide.*      *Drawbar guide.*



*Bell-strap guide.*  
*Brake-lever guide.*  
*Brake-rod guide.*  
*Dead-lever guide.*

*Glass-plate guide.*  
*Journal-box guide.*  
*Stop-bar guide.*  
*Strap-hanger guide.*

**Guide-bar.** 1. See *Truck-bolster guide-bar* or *column*, 37, figs. 1907-31.

2. (Of lamp-platform, which see). D, fig. 1190.

**Guide-block.** 38, figs. 1907-31. See *Truck-bolster guide-block*.

**Guide-rail.** A *door-track*, which see.

**Gum-spring.** A term used by Philadelphians to designate *india-rubber car-springs*, which see.

**Gun-car** or **cannon-car.** A specially heavy car for transporting ordnance, often having sixteen wheels.

**Gun-powder van** (English). A covered vehicle adapted to run on freight trains, and specially fitted for the conveyance of explosives. The outside of the body is made of or covered with iron plates to guard against fire, and the inside is lined with sheet lead to prevent any sparks being caused by friction. The door-openings are lined with felt to insure a tight joint.

**Gun-shaped lamp-chimney.** Fig. 933. See *Lamp-chimney*.

**Guy.** A rope used as a stay, as 35, fig. 1822.

**Guy-rings** (of a derrick or crane), 17, figs. 77-8. Rings attached to the head-block at the top of the mast to which guy-ropes may be attached.

**Guy-rope** (for leaders of pile-driver car). 35, fig. 1822.

## H

**Hair.** See *Curled hair*.

**Half-elliptic spring.** Figs. 102, 1959; 2, figs. 2036, 2031, 2035. See *Spring*. *Elliptic spring*.

**Half-elliptic spring-bearing.** 1, fig. 2026. A cast or wrought iron plate.

**Half-oval washer** (Janney coupler). 23, figs. 544, 555-601. The washer of the catch-spring bolt.

**Half-round bar spiral-spring.** Figs. 2059-60. See *Spring*. *Spiral Spring*.

**Hammer** of a pile-driver car. 1, fig. 1821-4. The heavy weight (4000 to 4500 lbs.) by which piles are driven. It falls between the *leaders* and is provided with a *hammer-eye* or *clevis* to which the shears of the *hoisting-rope* or *hammer-rope* are attached. In England called a *tup*, which also means a ram or male sheep.

**Hammered car-axle.** An axle made by forging under a hammer. Sometimes called *faggoted-axle*. Hammered axles are made either of slabs or bars of iron, which are piled together and then heated, welded and forged into the form of the axle by hammering, usually under a steam hammer. The slabs are made by piling small pieces of scrap-iron, which are then heated and welded together by forging, forming a *scrap axle*, which is by far in most extensive use, but the bars used for making such axles are sometimes made of rolled iron *muck-bars*, which see, and hence called a *muck-bar axle*.

**Hammer-eye**, or **clevis** (of a pile-driver car). 2, figs. 1821-4. See *Hammer*.

**Hammer-rope** (for pile-driver car). 39, figs. 1821-4. See *Hammer*.

**Hammer-rope pulley** (for pile-driver car). 40, figs. 1821-4. A pulley sometimes attached to the floor of the *swing-ing-platform* directly in front of the hoisting-gear.

**Hamilton refrigerator car.** An ice and salt car having six or more vertical tanks at each end of the car to obtain a large refrigerating surface. Each of the tanks is surrounded by a metallic shield on which moisture may condense, also serving as air-flues for promoting circulation. See *Refrigerator car*.

**Hamilton steeled-wheel.** A wheel made of cast-iron to which a small proportion of scrap steel has been added, varying from 5 to 40 per cent, according to the quality of the iron, which is claimed to increase its durability.

**Hand car.** Figs. 1708-26. A small and light car arranged with cranks or levers and gearing so that it can be propelled by hand by persons riding on the car. One of these cars is provided for each *section* of 3 to 6 miles of track. Originally the *crank hand car*, fig. 1708, was most used, but the *lever hand car*, fig. 1709, has now almost wholly supplanted it, as being much less laborious. Several improved forms, especially *double-lever hand cars*, such as the Crossman and the Kalamazoo, have been introduced to save weight and especially to avoid difficulty from the dead-centre, which see. A new form of recent introduction is the Jeffrey "*Railroad Speeder*," fig. 1717, worked by treadles. This is said, with strong probability, to be much easier to run than any other form, and the principle may be expected to be further extended to section hand cars. *Inspection hand cars* are a special variety, either from their fitting up, as

those in fig. 1710, or from their lightness, as the *three-wheel hand car*, figs. 1712-4, which weighs only 100 lbs. Hand cars for regular section service weigh from 400 to 800 lbs., generally about 600 lbs. *Telegraph hand cars* are a lighter class for the use of telegraph line-men.

**Hand-car lever, or propelling lever.** 19, figs. 1720-22.

**Hand-car truss-rod.** 26, figs. 1720-3. A transverse or longitudinal rod by which the floor-frame of a hand car is trussed.

**Hand-car wheel.** Figs. 2141-3. A light wheel for hand cars, with cast-iron rim and hub and wrought-iron spokes, or sometimes with a wooden centre.

**Hand-hold.** Another term for *grab-iron*, which see, in common use on the Pennsylvania Railroad system and elsewhere.

**Hand-hole.** See *Dust hand-hole*. *Fare-wicket*.

**Handle.** "That part of anything by which it is held in the hand. A haft. As the handle of a knife or other instrument."—*Worcester*. They are designated by the name of the part or thing to which they are a handle, as *Ash-pit door handle*, etc.

A *grab-iron* is often called a handle, and was so named in the last edition of this dictionary, but *grab-iron* is more common, and the part is not properly a *handle*, which means in general that part by which an object is held and moved about or controlled.

**Handle spring** (Westinghouse engineer's brake-valve). 15, fig. 334. A spring carrying a dog to hold the handle in any desired position.

**Hand-rail.** A bar or rail to take hold of with the hand; as the *body hand-rail* of passenger-car platforms, *door hand-rail*, *inside hand-rail*, and *step hand-rail* of street cars, and *roof hand-rail* or *brake hand-rail* of box and stock cars, 3, figs. 252-4, all of which see.

2. (Tank cars.) 121, figs. 139-42. An iron pipe supported on *hand-rail posts* on the outside of the running board, for trainmen to hold on to in passing cars.

**Hand-rail bracket** (postal cars). Figs. 1080-5. See also *Inside hand-rail bracket* (street cars, etc.).

**Hand-rail brace** (freight-car roofs). 4, figs. 252-4. See *Roof hand-rail*.

**Hand-rail post** (tank car). 122, figs. 139-42.

**Hand-wheel** (for slewing gear of pile-driver car). 48, figs. 1821-4. See *Slewing-gear*.

**Hand wrecking or derrick car.** Figs. 80, etc. See *Wrecking car*.

**Hand-straps** (street and suburban cars). 96, figs. 1843-6. Straps attached to the inside hand-rail for passengers to hold on by. Generally made in the form of a double loop.

**Hand-wheel.** A *Brake-wheel*, which see.

**Hanger.** 1. "That by which a thing is suspended."—*Webster*.

2. "A means for supporting shafting of machinery."—*Knight*.

See *Bell-cord hanger*.

*Berth curtain-rod hanger*.

*Brake-hanger*.

*Door-hanger*.

*Link-hanger*.

*Parallel brake-hanger*.

*Push-rod hanger*.

*Rocker-bearing-timber hanger*.

*Safety-hanger*.

*Spring-hanger*.

*Step-hanger*.

*Strap-hanger*.

*Swing-hanger*.

*Swing-link hanger*.

*T-hanger*.

**Hanger-link.** A *Swing-hanger*, which see.

**Hanger-pin** (of "American" steam driver brake). 17, figs. 358-9, 363-5. The pin by which the *brake-shoe hanger*, or *forked hanger* is attached to the brake-shoe.

**Hanger-stud** (of "American" steam driver brake). 10, figs. 358-9; 16, figs. 363-5. The upper attachment of the *brake-shoe hanger* or *forked hanger*.

**Hanging-boards, or meat-timbers** (refrigerator car). Fig. 130a. Transverse bars resting usually on *bogus plates*, to which the load of meat is suspended.

**Hanging-door sheave.** Figs. 791, etc. See *Car-door hanger*.

**Harrison postal-car chandelier.** Figs. 840-2. See *Chandelier*. An elaborate form of postal-car chandelier with four lamps, having large reflectors all pivoted on a *revolving lamp-disk*, to throw a strong light on any point.

**Hartshorn shade-roller.** Fig. 1686. See *Shade-roller*. An ingenious device to hold window-shades at any desired point by means of *centrifugal pawls* which fly out and do not check the revolution of the roller while in rapid motion, but engage with and hold it at any point otherwise. The *McKay* shade-roller is somewhat similar, but uses a cam instead of a pawl.

**Hasp** (also sometimes termed shackle). I, fig. 1011; B, figs. 1108-9; 3, fig. 1109. The bar which fits over a *staple* and is fastened thereon by passing the *shackle* of a padlock through the staple or by a pin. The other end of the



hasp is attached by a pin or another staple to the door. See *Door-hasp*. *Head-board coupling-hasp*.

**Hard-hair.** A quality of curled-hair which is very stiff or rigid. See *Curled-hair*.

**Hart deck-sash pivot and ratchet catch.** Fig. 1624.

A device for regulating the opening of deck-sashes, the special feature of which is the undulating rack, enabling the sash to be easily moved by the hands and yet holding it fixed when released in any one of several different positions.

**Hartley parlor-car chair.** Figs. 1154-8. One of the leading varieties of adjustable chairs for railroad use. In its complete form it has three separate adjustments of the foot-rest, the back and the head-rest. A *rear foot-rest* is also sometimes attached for the benefit of the occupant of the chair in the rear. The adjustments are controlled by a *thumb-lever*, *chair-lack latch* and *adjusting-lever*.

**Hat-cords.** Cords which are placed under the ceiling of a passenger-car and to which hats can be hung up by their rims. Seldom used. A metal plate called the *hat-cord end fastener*, with a centre hole and wedge bushings, is used at the ends of the car, and eyes called *hat-cord hangers* at intervals between. See *Hat-post*.

**Hatfield hanging-door sheave.** Fig. 791. See *Car-door hanger*.

**Hat-hook.** Fig. 1550. A metal hook for hanging hats on.

**Hat-post.** 18, figs. 676-7; 2, figs. 1271-2, 1551-2. An upright metal pin for hanging hats on. These are used chiefly in sleeping and parlor cars.

**Hat-post and hook.** Fig. 1552.

**Hat-rack.** A *basket-rack*, which see.

**Hay-car.** A box car for carrying baled hay; usually made with larger bodies and doors than ordinary box freight cars.

**Head.**

1. See *Cylinder-head*,  
*Brake-head*,  
*Buffer-head*,  
*Cross-head*,  
*Dome-head*.

- Draw-head*,  
*Drawbar head*,  
*Piston-head*,  
*Tank-head*.

2. (Gouge heater.) Fig. 1440. See *Head-joint*.

**Head-block** (of a derrick or crane). 18, fig. 77; H, figs. 151-3. The casting carried at the top of the *mast* to which the boom-shee rods, tension-rods and guy-rings,

etc., are attached. It usually revolves upon a *head-block pin*.

2. (Of a switch.) The long timber to which the switch-stand or its equivalent is fastened, and on which the ends of the switch-rails bear.

**Head-board.** 16, figs. 676-8. A light partition which separates one berth in a sleeping-car from that next to it. It is stowed away by day in the pocket between the upper berth, when closed up, and the roof. It is secured in place at the back and front by *head-board bolts* entering at the back into a *bushing*, fixed to the top of the stationary seat-back, and along the upper inside edge by a *head-board coupling*, entering into a *head-board coupling keeper*. The head-board bolt for the front corner of the head-board is of peculiar construction designed to avoid all interruption of a flush surface by day, while still giving a secure attachment.

**Head-board bolt.** Figs. 1278-82; 17, figs. 676-81. See above.

**Head-board-bolt bushing.** Figs. 1280-1. See above.

**Head-board coupling.** Figs. 1275-6. A metal *hasp* and *keeper* by which a head-board is fastened to the side of the car.

The titles to figs. 1275-6 are misplaced. Fig. 1275 should read "Head-board-coupling keeper," and fig. 1276, "Head-board-coupling hasp."

**Head-board-coupling hasp.** Fig. 1276. See above.

**Head-board-coupling keeper.** Fig. 1275. See above.

**Head-board lug.** Fig. 1279½. Serves same purpose as a *bushing*, which see.

**Head-board pocket.** 32, figs. 676-81, 1284. A pocket which closes up flush with the head-board surface, but opens at night, by releasing a *head-board rack-catch* so as to afford a receptacle for clothing or parcels.

**Head-casting** (of a derrick or crane). 6, fig. 78. A large casting placed at the upper end of the *boom* in certain forms of derricks. A similar one is shown at L<sub>2</sub>, fig. 152.

**Head-joint** (Gouge heater). Fig. 1420. The part on which the *ventilating head* (fig. 1440) sits, and into which the *shield-box* (fig. 1441) slips through the deck-sash, for the purpose of drawing out the foul air from inside the car.

**Headlight burner.** Fig. 876. A burner of extra capacity for locomotive headlights.

**Head-lining.** A painted canvas lining with which the ceilings of passenger cars are covered. The painting on

- head-linings is intended to be of an ornamental character. When of wood the head-lining is called *ceiling*. The duck for head-lining comes in any width up to 12 feet. Head-lining is sometimes cut up into panels, but a *paneled ceiling* is usually understood to be a wood ceiling, which is largely supplanting canvas head-linings.
- Head-lining nail.** Figs. 1045-54. A nail with a large button-shaped head especially made for fastening head-linings to the ceilings of cars.
- Head-rest.** 1. (Hartley chair.) See *Head-rest carrier*.  
2. (English.) 199, figs. 204, 205, 206. In a first-class carriage, a fixed vertical wooden projection from the back of the seat, thickly padded with horse hair and covered with broadcloth or leather. It serves to support the side of the head of a passenger.
- Head-rest carrier.** (Hartley chair). 10, figs. 1154-8. Arms pivoted to the upper portion of the back frame and carrying the *head-rest*. Their position is regulated by a *thumb-lever* at the side of the chair.
- Headstock** (English). 2, figs. 116, 117, 205 and 206. American equivalent, *end-sill*. The transverse end member of the *underframe*, which see. It is pierced transversely in the centre for the draw-gear, and the buffing gear is carried near the ends.
- Headstock and diagonal-knee** (English). 83, fig. 206. A wrought-iron knee connecting the *headstock* to the *diagonal* and the *sole-bar*, and thus binding three of the four main members of the *underframe* together.
- Spring-link, or spring-shackle** (English). 84, fig. 205. American equivalent, *spring-hanger*, a term also used in England. A link attached to the end of a laminated spring by which the weight is placed upon it.
- Headstock cap** (English). 13, figs. 205 and 207. A *cast-iron* cap fitting the end of the headstock in order to prevent its splitting, and to prevent any access of water to the end grain of the wood. A wrought-iron strap is sometimes used.
- Heat-conductor** (Bissell heater). Figs. 1363-4, 1382-7. Cast-iron hot-air flues near the stove connecting with the *running-pipes* along the corner of the car.
- Heat-regulator.** Figs. 1491-2. See *Spear's draft-regulator*.
- Heater.** Figs. 1300-1537. Any apparatus for warming a car, room or building by convection; that is, by conveying hot water, steam or warmed air into or through

the apartments. The term generally refers to any arrangement for warming apartments other than stoves, which heat by direct radiation. The varieties shown are the *Baker*, *Johnson* and *Searle* heaters, which circulate a hot fluid through radiators under the seats, the *Bissell*, *Gouge*, *Spear*, *suspended*, and *Winslow* heaters, which circulate hot air through *running-pipes* (*hot-air pipes*, or *delivery-pipes*) under the seats, and sundry forms of plain stoves heating by direct radiation. The latter are rapidly passing out of use, although still largely used. The *Gouge* has a particularly elaborate system of ventilation connected with it. The heaters which circulate hot water are usually placed in a small closet called the *heater-room*, which see. In emigrant cars *cook-stoves* are used as heaters. The *ranges* of dining-cars, although used for cooking purposes only, are shown in connection with the heaters.

2. (For Johnson heater.) Fig. 1472. A series of vertical pipes connected at each end to a hollow annular casting. The heater-pipes form the outside of the fire-pot.

3. (For lamps or lanterns.) A metallic attachment passing around and above the flame (figs. 932) or otherwise immediately adjacent to it, as in fig. 912, by which heat is conveyed to the oil in the reservoir below, to prevent freezing, or, in some cases, to assist combustion by heating or volatilizing the oil.

**Heater-car.** One constructed for the carrying of fruits, vegetables and other perishable products in winter. They are heated by special forms of mineral oil lamps, the supply to which is automatically controlled by the expansion and contraction of metallic rods. They are principally in use in the New England states for the transportation of potatoes and other vegetables.

**Heater-room.** Figs. 193, 214, etc. A small closet, cased with sheet metal interior *heat-guards*, to contain the heater and prevent all direct radiation. All heaters proper are placed in some equivalent for such rooms. The doors are usually closed with an open screen like fig. 1046.

**Heater-pipe casing.** 10, fig. 1122. A wooden or iron shelf over a heater-pipe in a passenger car to prevent the feet of passengers from coming in contact with the hot pipes. The casing also forms a foot-rest.

**Heater-plate** (of oil lamp). Fig. 912. A device to con-



duct the heat of the flame downward so as to keep the oil from congealing. See also fig. 902.

**Heat-guard.** A sheet-metal covering for the wood-work of a passenger car, to protect it from the heat of a stove. It is nailed to the side and ends of the car, and sometimes surrounds the stove, as the conical Russian-iron heat-guard of the Baker heater, fig. 1312.

**Heating-burner (Minot).** Fig. 902. See *Heater-plate*.

**Heel (of shackle of padlock).** D, figs. 1029-30. The inner point of the *shackle*, which see.

**Height of drawbar.** See *Drawbar*.

**Helper.** A term used to designate either an assistant engine for trains, or a horse to help street cars up grades.

**Helper-ring (street cars).** An iron ring fastened to the platform end-timber to attach an extra horse to pull up steep grades.

**Hemp packing (Atwood's hemp-packed wheel, which see).** C, figs. 2166-67. A mixture of hemp and vaseline driven in with a steam-hammer between the tire and wheel centre.

**"Hercules" hearing.** Fig. 1995. One of the forms of so-called *Babbitt-metal bearings*, which see.

**Hewitt journal-hox lid.** Figs. 2015-17. An invention, patented June 19, 1877, which consists in adding grooved lugs on the outside edges of a journal-box, in which the lid slides, but is prevented from escaping, after the truck has been put together, by striking against the arch-bars or wheel-piece of the truck. A form not illustrated has the front edge of the journal-box formed to a circular outline, as is also the journal-box lid, the latter sliding upon circular ridges cast upon the outside of the journal-box. It is very largely used and much liked from its simplicity. The choice for a standard seems to lie chiefly between it and the *Fletcher*, which see, so far as can be judged from informal expressions of opinion.

**Hihhard spring.** Fig. 2062. A spiral spring composed of several coils of steel of rectangular section. The coils are placed inside of each other and are made of different diameters and wound in opposite directions, or "right and left." The spring is named after the inventor.

**Higgs refrigerator car.** A car using ice only, carried in ice-racks at each end of the car, and with a drip-pan of somewhat novel design directly under it and standing up above the floor of the car so that the water may be utilized in part for cooling. The back of the car has an

especially careful and elaborate system of insulation by air-spaces.

**High-sided wagon (English).** A four-wheeled gondola car, with sides about 4 feet high. Resembles wagon shown in figs. 116-119, except that the sides are higher. Used chiefly for bulky freight, wheat, potatoes, sacks and bales. See *Wagon*.

**Hinge.** Figs. 779-90, etc. "A hook or joint on which a door, gate, etc., turns."—*Webster*. They are provided with a tube-like *knuckle* through which the *hinge-pin*, which see, passes.

See *Door-hinge*.

*Double-acting hinge.*

*Drop-door hinge.*

*Man-hole hinge.*

*Seat-hinge.*

*Sofa-hinge.*

*Stop-bar hinge.*

The common door-hinge is usually a *butt* or *butt-hinge*, the varieties of which are the *acorn-butt*, a large ornamental hinge, *Blake-butt*, which see, and the *hopper-butt*, so called from its pointed form. The *parliament hinge* is a sort of T-shaped butt-hinge to afford more room for screws. It is little used except for ornamental purposes. The *strap-hinge* is a common form of rough hinge for heavy doors, but it is sometimes made very elaborate and ornamental. A *T-hinge* is a combination of the butt and strap-hinge, one-half being of each form. Butt-hinges are either *fast-joint*, *loose-joint* or *loose-pin*. A *double-acting hinge* is one which permits the door to swing either way. *Berth-hinges*, figs. 1237-40, are also loose or fast-joint. *Sofa-hinges* and *seat-hinges* are used in sleeping cars to connect the seat and seat-back.

**Hinge-burner (mineral-oil lamp).** Figs. 893, etc. A burner of which the chimney-seat is hinged to the lamp-top so as to give access to the wick. They are in decreasing use. *Lamp-chimneys for*, figs. 931-2.

**Hinge-pin.** Figs. 789, etc. The pin passing through the knuckle of a hinge and holding the two parts together. A *loose-joint* butt-hinge has the pin fast in the lower half of the knuckle and projecting upward, so that the other half is held on only by gravity. The hinge-pin in the best hinges screws into the knuckle.

**Hinge-plate washer (English).** 73, figs. 116-119. A long wrought-iron washer taking all the bolts securing the main part of the hinge to the door.

**Hodge brake.** Fig. 235. An arrangement invented by Nehemiah Hodge, patented 1849, for operating the

brakes on each truck of a car simultaneously, and equalizing the pressure on all the wheels. The brake may have either one or two levers on each truck. Underneath the car-body are two levers called *floating-levers*, with movable fulcrums in their centres, which are connected together by a rod. One end of each of these levers is connected by a rod and chain to the brake-shaft, and the other end of the floating-lever is connected by a rod with the long arm of a brake-lever on a truck.

**Hog-chain.** "(Shipbuilding.) A chain in the nature of a tension-rod passing from stem to stern of a vessel, and over posts nearer amidships; designed to prevent the vessel from drooping at the ends."—*Knight*.

Hence applied to certain forms of trusses in car construction, as in the pile-driver car, 36, figs. 1281-3, or wrecking car, B<sup>2</sup>, figs. 146-50. A hog-chain is an *inverted truss-rod*, and usually so called when applied in connection with and in similar form to a body truss-rod, as in figs. 146-50, the object of a truss-rod being to prevent a beam from sinking in the middle, and of a hog-chain to prevent sinking at the ends when supported at the middle.

**Hog-chain queen-post** (iron-frame wrecking car.) B<sup>4</sup>, figs. 144-9. See above.

**Hog-chain rod** (of a passenger car). 167, fig. 159. See above. More properly a *continuous counterbrace rod*.

**Hoisting-block** (of a derrick or crane). 3, figs. 77-8. The main block at the lower end of the *hoisting-chains* carrying the *sheave-hook*, or *hoisting-hook*, to which the load is attached.

**Hoisting-block clevis.** 4, figs. 77-78. A clevis carried at the top of a hoisting-block to which the fixed end of the hoisting-chain is attached. In some cases, as in L, figs. 151-3, it is attached to a clevis at the upper end of the boom.

**Hoisting-chain** (of a derrick or crane). 21, figs. 77-8. The chain attached to the hoisting-drum at one end and to the hoisting-block or boom-clevis at the other, by which the loads are raised.

**Hoisting-chain sheave.** E<sup>3</sup>, figs. 144-7. A pulley placed in some wrecking cars at the foot of the mast, when the hoisting-gear is at some distance from it. The term is equally applicable to the *mast-sheave* and *boom-*

*sheave* at the top of those parts of a derrick, but the latter are generally otherwise distinguished.

**Hoisting-hook.** 2, figs. 77-78. See *Sheave-hook*. See also *Hoisting-block*.

**Hoit double-spring drawbar.** Figs. 426-7, 93-6, and in use attached to a car in figs. 93-96 and 113-15. A method of placing auxiliary draw-springs in a car so as to give a separate spring for buffing and for tensile strains, and also to obtain in effect a continuous drawbar.

**Holder.** "Something by which a thing is held."—*Webster*. A great variety of parts which serve this purpose are so called, as *door-holder*, *lamp-holder*, etc., which take their names from the thing which they hold.

**Hollow-spoke wheel.** Figs. 2127-8. See *Car-wheel* and *wheel*.

**Hood.** 1. See *Platform-hood*. *Ventilator-hood*. A *roof-apron* which is attached to both *platform-roofs* and *platform-hoods* is sometimes called a hood.

2. (Spear heater.) Figs. 1486-8. More properly a *ventilator* or *wind-scoop*. A horizontal tube or covering on the outside of a car, and on top of the cold-air pipe, so as to give the latter a T shape. The air is admitted to the pipe through the ends of the hood, which are covered with wire netting to exclude cinders. It has a valve which is moved by the current of air so as to admit it whichever way the car runs.

3. (For urinal.) Figs. 1092-3. More properly *ventilator cap*. A similar but less elaborate part to that defined apart.

**Hook.** See

<i>Bell-cord end-hook.</i>	<i>Hat-hook.</i>
<i>Berth-catch hook.</i>	<i>Hat-post and hook.</i>
<i>Berth-curtain hook.</i>	<i>Pouch-hook.</i>
<i>Body check-chain hook.</i>	<i>Lamp-case hook.</i>
<i>Check-chain hook.</i>	<i>Seal-hook.</i>
<i>Coat-and-hat hook.</i>	<i>Slanting table-leg hook.</i>
<i>Coat-hook.</i>	<i>Stake-hook.</i>
<i>Coupling-hook.</i>	<i>Table-hook.</i>
<i>Door-hook.</i>	<i>Table-leg hook.</i>
<i>Door-latch hook.</i>	<i>Tank-band hook.</i>
<i>Drawbar coupling-hook.</i>	<i>Tassel-hook.</i>
<i>Draw-hook.</i>	<i>Truck check-chain hook.</i>
	<i>Window-curtain hook.</i>

**Hoop** (for oil lamps). Figs. 918-23. A ferrule with an interior thread into which the burner screws.

**Hoopstick** (English). See *Roofstick*.

**Hopkins' journal-bearing.** Figs. 1993-4. One of the principal if not the only form of *lead-lined journal-bearing*.



*ings*, which see, which use a *thin* coating of lead inside an ordinary brass bearing.

**Hopper.** 1. (Passenger cars.) Figs. 1093-6. A *closet-hopper*, or *soil-hopper*.

2. (Freight cars.) See *Hopper-bottom car*.

**Hopper-bottom car.** Figs. 16-33; also figs. 105-12. A car with an inclined bottom sloping from every side (or simply from the ends), to *drop-doors* in the centre, so that the entire contents can be discharged. They are chiefly used for carrying coal, but sometimes other minerals. They are the chief class of *four-wheeled* cars, but eight-wheeled hopper-bottom cars are also largely used. *Hopper-bottom gondola cars*, figs. 16-18, etc., have a similar bottom in their centre, but not so formed as to completely discharge their contents without assistance. They are often called *dump-cars*, as are also *tip-cars*, which see. They vary in appearance between the two extremes, figs. 15 and 16. *Iron-hopper* coal cars, resembling more or less fig. 21, which is a type largely used on the Baltimore & Ohio Railroad, are also used, and the bottom of the hopper is often made of iron *hopper-plates* even in wooden cars.

An attempted distinction between the terms *hopper-bottom* and *drop-bottom*, is that the hopper-bottom discharges its whole content on releasing the doors, while a drop-bottom car, which is often a mere flat car with a trap in the centre, does not. The distinction is not well observed.

**Hopper-chain.** 2, figs. 109-12. See *Drop-door chain*.

**Hopper-plates.** 20 and 33, figs. 109-12. The sheets of iron constituting the bottom of a hopper-bottom coal car. When this part is of wood it is termed the *inclined floor*.

**Hopper transom.** 10, figs. 109-12. This reference is erroneous, and should read *inclined-floor cross-bar*, which see.

**Hopper ventilator.** Figs. 1037-8. See *Bell's exhaust hopper ventilator*.

**Horizontal brake-shaft.** 95, figs. 82-84, 132-136. A brake-shaft usually at the end of a car-body, whose position is horizontal instead of vertical, so that it can be applied from below. When used at all, which is the exception, it is commonly in combination with a long brake-shaft of the ordinary kind at the other end of the car.

**Horizontal brake-shaft chain.** 104, figs. 82, 84. A chain attached to a brake-rod at the end of a car and

running over a pulley to a horizontal shaft on which it is wound.

**Horizontal-cylinder steam-driver brake.** Figs. 353-9.

One of the four styles of steam driver-brakes manufactured by the American Brake Co. See *Driver-brake*, etc.

**Horizontal telegraph-cock, or faucet.** Fig. 1592. See *Faucet*.

**Horn.** 1. 100, figs. 1955-73. See *Pedestal-horn*.

2. (Janney coupler.) 21, figs. 542-554, 555-601. A part rigidly fastened to the coupler or drawbar, by means of which the coupler and buffer springs are connected.

3. (Janney-Miller coupler.) 43, figs. 542-554, 555-601.

**Horn-bolt** (Janney coupler). 19, figs. 555-601. The bolt securing the horn in place.

**Hornplate** (English). The name given to the part of a locomotive or tender which on other railroad vehicles is termed *axle-guard* (American, *pedestal*), which see.

**Horse box** (English). A four-wheeled covered vehicle adapted to run on passenger trains. It is fitted with large side doors and mangers, and is divided into three stalls by movable padded partitions. See also *Racehorse box*.

**Horse-car.** 1. Fig. 8. A box-car fitted up especially for carrying horses, by leaving certain slatted openings, etc. They are then classed under the general name of *box-stock* car. Some horse-cars are very elaborate.

2. Figs. 1835-34. *Street cars*, which see, drawn by horses, are very frequently called horse-cars.

**Horse-hook, or towing-hook** (English). 81, figs. 116-7. Nearest American equivalent, *pull-iron*. An iron hook attached to the sole-bar and forming an attachment for a rope by which the vehicle can be drawn. Horses are largely used for switching in England.

**Horton chair.** Figs. 1132-3. A form of adjustable parlor-car chair. The adjustments of which the chair is capable and the names of the separate parts are very similar to those of the Hartley chair, figs. 1154-8, but the details of construction are different.

**Horton chair-car, or simply chair-car.** Figs. 35, 159-160. A term used on roads using the Horton chair as an equivalent for parlor car. Chair-cars, however, are now much used for ordinary first-class service without extra charge.

**Hose.** Flexible tubing, made of leather, canvas, or india-rubber, for conveying water, air, or other fluids. It is

sometimes *armored*, which see. See also *Brake-hose*.  
*Coupling-hose*. *Tender-hose*.

**Hose-couplings.** See *Brake-hose couplings*.

**Hot-air box** (Winslow heater). Fig. 1533. A box, in other heaters called the *running-pipe* or *hot-air pipe*, passing along the sides of the car under the seats with a register adjacent to each seat and connecting with the air space around the stove, so as to deliver hot air through the car.

**Hot-air conductor** (Bissell heater). Figs. 1363-4. See *Heat-conductor*.

**Hot-air delivery-pipe** (suspended heater). G, figs. 1529-32.

**Hot-air elbow end box** (Spear heater). Fig. 1523.

**Hot-air flue** (suspended heater). E, figs. 1529-32.

**Hot-air pipe.** 1. (Gouge heater.) 54 and 55, figs. 1413-4 (*back* and *front*). The vertical pipes within the case connected with the delivering *running-pipes* by the front and back *offsets*.

2. (Bissell heater.) Fig. 1350.

3. (Spear heater.) 3, figs. 1486, 1490.

**Hotel-car.** Fig. 54. A sleeping car with a kitchen for cooking and arrangements for serving meals. *Dining cars* have kitchens, etc., but no sleeping-berths. Hotel-cars seem to be passing out of use in favor of dining cars.

**Hotel-car range.** Fig. 1480. See *Range*.

**Hot-water heater.** Figs. 1484-5. See *Searle hot-water heater*. The Baker, Johnson, etc., heaters are also hot-water heaters, although not so styled.

**House-car.** An occasional term for a *box car*, which see.

**House of the drawbar.** Figs. 403-4. See *Drawbar*.

**Housing-box.** A *journal-box*, which see.

**Howard's parlor-car water-closet.** Figs. 1087-89. A device, the essential feature of which is the connection between the seat-lid and the pan and service measure, by which no water is carried to the pan except on opening the lid. See *Parlor-car water-closet*.

**Howard safety berth-latch.** Figs. 1261-2. See *Safety berth-latch*. The *Dayton* is another kind. The two differ very slightly.

**Howard stove.** Fig. 1475. An old-fashioned wood-burning stove. Wood is now little used as fuel on cars.

**Hub** (of a car-wheel). 21, fig. 2002; figs. 2124-80. The central portion into which the axle is fitted. It is usually

cylindrical in form, and projects beyond the disks or spokes of the wheel on each side. In England termed the *boss*. See *Interchangeable hub*.

**Hub-bolts** (steel-tired wheels, which see). Figs. 2159-71. Bolts fastening the *face-plates* to the *hub*.

**Hurricane-lamp** (another name for *tornado-lamps*, which see). Figs. 835, 838, 845, 860, 867, are hurricane, or tornado-lamps.

**Hutchins' car-roof.** A form of roof consisting of two layers of boards with a species of dovetail joint to connect them, and separated by a continuous sheet of thin painted canvass. See *Car-roof*.

**Hydraulic jack.** Figs. 1884-87. A tool or machine in which the power is exerted by means of the pressure of some liquid acting against a piston or plunger, for raising heavy weights, like a car. The pressure on the liquid is produced by a small pump worked by hand.

**Hydraulic-pressed car-candles.** Candles made of paraffine by hydraulic pressure. See *Candles*.

## I

**I-beam.** A general term applied by makers to any form of rolled iron having an I cross-section. The top and bottom parts are termed the *flanges* and the middle the *web*. The usual dimensions are given by the total height from out to out, and vary from three to fifteen inches. When one of the flanges is simply a round bar it is termed a *deck-beam*. I-beams are but little used in car construction, channel-bars being used instead for trucks; but they are sometimes used for iron centre and intermediate sills, as in figs. 148, etc., channel-bars being used for the side-sills.

**Ice-car.** A car for transporting ice, usually constructed with double roofs, floors and sides, filled in with sawdust or other non-conducting substance.

**Ice-pan** (refrigerator cars). 4, figs. 130, etc. The receptacle for carrying ice, especially roof ice-pans, in distinction from *ice-racks* at the ends of the car.

**Igniter, or signal-holder** (for blue-light signals). Fig. 1043. A wooden handle having a piston in the end for igniting the blue-light by compression.

**Inclined floor** (coal cars). 134, figs. 105-7. Subdivided into *inclined end-floor* and *inclined side-floor*, the latter not always used. When of iron, as 20 and 36, figs. 109-



11, as is more usual in modern practice, the inclined floor-plates are termed *hopper-plates*.

**Inclined floor cross-bar** (hopper-bottom coal car). 10, 11, figs. 109-11. Cross-bars passing from one sill to the other, in the modern cars usually of iron, supporting the inclined hopper-plates, or wood floor.■

The name hopper transom, given for 10 in the list for figs. 109-12, is erroneous and should be read *Inclined floor cross-bar*.

**Inclined floor-timbers** (coal car). 153, figs. 105, 107; 21, fig. 109. The wooden sills to which the inclined floor of a coal car is nailed.

**Inclined-plane car**. Fig. 1825. A passenger street car which is drawn by a wire rope on a steep inclined plane. The car is so arranged that the floor will be level when the wheels are on the incline, by making the wheels at one end larger than at the other, or by raising up one end of the car-body.

**Inclined side-floor** (coal car). 135, figs. 106-7. See *Inclined-floor*.

**Independent hub** (Snow's steel-tired car-wheel). Figs. 2163-4. A hub so constructed that the outer portion of the wheel can be taken off from it without removing the hub from the axle.

**India-rubber body-cushion**, or **Attock's body-block** (English). 186, figs. 204-5. A piece of rubber about 6 in. × 3 in. × 1 in. thick, interposed between the body and the underframe, serving to deaden noise and vibration and permit a free circulation of air to the floor timbers.

**India-rubber**. A gum which exudes from a tropical tree growing in the East and West Indies, Mexico, South America, etc. It is prepared for use by *vulcanizing* with a greater or less proportion of sulphur, according to the stiffness required. In its pure state it is used for little else than removing pencil marks.

**India-rubber car-spring**. Figs. 2042, 2043-8. A spring consisting of a cylindrical block of india-rubber. Such springs have been used both for carrying the weight of cars and for buffer and draw-springs. Now rarely used in this country but largely in Europe.

**India-rubber floor-mat**. Figs. 806-7. See *Floor mat*. They are either *perforated* or *corrugated*.

**Ingate**. "The aperture in a casting-mould at which the melted metal enters."—*Knight*. Often called a *gate*.

**Injector** (Gouge heater). Fig. 1415. A large hood or wind-scoop on the roof of the car to catch the air and force it through the various pipes into the car. It has a swinging *valve* 74 (misprinted as 14, feed-door lining). Corresponding parts on other heaters are called *hoods*, *jacks*, *ventilators*, *ventilator-jacks*, *wind-scoops*, etc.

**Injector connecting-joint** (Gouge heater). 77, figs. 1409, 1412. See above.

**Injector-end of case** (Gouge heater). 80, fig. 1409.

**Injector-pipe** (Gouge heater). 17, figs. 1405-7. 56, figs. 1413-4.

**Injector-valve** (Gouge heater). 75, figs. 1413-4. See *Injector*.

**Injector-pipe valve-chain** (Gouge heater). 76, figs. 1413-4.

**Inlet elbow** (Gouge heater, which see). Fig. 1462.

**Inlet-strainer** (*inner* and *outer*), (Lorenz refrigerator car). V and W, figs. 130-130½. A wire grating to keep out dirt and insects from the air-passages.

**Inner-coil** (graduated bolster-spring). 2, figs. 2095-6. See *Spiral spring*.

**Inner draw-bar carry-iron** (Miller coupler). 32, figs. 636, 638. A U-shaped strap of wrought-iron bolted to the suspender-beam to support the drawbar coupling-hook.

**Inner-hung brake**. Figs. 227, 234, 1927-8. When the brake-shoes and beams are *between* the wheels. When attached on the outside, it is an *outer-hung brake*.

**Inner lamp-ring** (English). 168, fig. 205. An ornamental metal or wooden ring in the inner surface of the roof surrounding the aperture for the *roof lamp*, which see.

**Inscription-plate** (Miller platform). 46, figs. 637-40.

**Inside ash-pit door** (*right* and *left*) (Johnson heater). 4 and 5, fig. 1472.

**Inside body-corner knee** (English). 76, figs. 116-9. American equivalent, *sill knee-iron*, or *corner plate*, which latter is used outside instead of inside. A wrought-iron knee placed in a horizontal plane securing the end and side of the body together.

**Inside-casing** (Baker heater). 5, fig. 1301; fig. 1306. Sheet-iron bent and riveted into the shape of a frustum of a cone which forms the top of the fire-pot.

**Inside casing**. 1. (Suspended heater.) B, figs. 1527-32. The inner shell around the fire-box.

2. (English.) 129, figs. 204, 206. Boards in the inside

of the body attached to the framing of the sides and ends. Also called *inside lining*.

**Inside-cornice** (passenger car interiors). 94, figs. 158-76; 36, figs. 679-81, 692-3. A moulding which fills the angle where the roof joins the side of the car.

**Inside-cornice fascia-board**. 95, figs. 175-6; 37, figs. 692-3, 679-81. A projecting board which forms a moulding or ornament under the *inside cornice*. The *sub-fascia board* lies under it. The arrangement of these details, however, is frequently varied.

**Inside-cornice sub-fascia board**. 96, figs. 175-6; 38, figs. 692-3, 679-81. See above.

**Inside door-knob** (Kirby's car-door lock). A, figs. 1003-4.

**Inside end-piece** (of truck-frame). Figs. 1942-70. The end-piece which is nearest to the centre of the car.

**Inside fire-dcor** (Johnson heater). 13, fig. 1472.

**Inside frieze-panel** (street cars). 31, fig. 1843. A panel on the inside over a window.

**Inside hand-rail** (street cars). 94, figs. 1843-4. A rail, usually made of wood, attached to the rafters by metal *brackets*, and carrying leather straps in the form of loops for passengers to hold fast to.

**Inside hand-rail bracket**. 95, figs. 1842-4, 1856. See above.

**Inside-lining**. 1. 53, figs. 89-104; 97, figs. 175-6. The boarding which is nailed to the insides of the posts of freight, baggage and other cars. In box-cars it extends half way up only, to the *girth*. *Inside-lining* becomes sometimes *inside sheathing* when it is carried up to the roof, and is the only sheathing for the car, the frame being left exposed.

2. (English.) See *Inside casing*.

**Inside-lining cap**. A *girth*, which see. See also above.

**Inside-lining stud**. 176, fig. 93. A stud extending from the side-sill to the *girth* to serve as a "nailer" for the inside-lining.

**Inside magazine-door** (Johnson heater). 11, fig. 1472.

**Inside mouth-piece** (Gouge heater). 29, fig. 1448. A part extending from the inside of the fire-box into the *mouth-piece*, 27. It is bolted to the latter through the flanges. See *Mouth-piece*.

**Inside perforated-top** (Bissell heater). Figs. 1383, 1575. See *Perforated-top*. (Johnson heater.) 24, fig. 1472.

**Inside-ring** (Spear heater). 15, fig. 1490; fig. 1503. A

perforated circular casting placed between the fire-pot and the casing.

**Inside-shell** (Kirby's car-door lock). H, figs. 1003-4. A kind of escutcheon on the inside face of the door inclosing the *latch-pull* within it.

**Inside spring-case**. Fig. 2106. A shell cast on the spring-plates to keep the coils in place.

**Inside top-plate** (Spear heater). 11, figs. 1490, 1494-7, 1517-18. A cast-iron plate with a hole, in the centre or "set-back", to which the smoke-pipe is attached. It forms a cover for the fire-pot.

**Inside wheel-piece plate**. 12, figs. 1968-9. See *Wheel-piece*.

**Inside window-panel**. 89, figs. 155-81; 24, figs. 678-81; 35, figs. 692-5, 679-81. A panel inside of a passenger car between the windows.

**Inside window-sill**. 78, figs. 175-6; 5, figs. 692-4, 679-81. A horizontal piece of wood under the window on the inside.

**Inside window-stop**. 86', fig. 175; 7, figs. 692-5. A wooden strip attached to a window-post on the inside of a window-blind or an inner sash of a double window. It forms a groove in which the blind or window-sash slides. Also called *window casing*. Sometimes the *window-moulding* forms a stop on the inside.

**Inspection car**. 1. A car used for inspecting track of a railroad. One form is that of a gondola car, inclosed and roofed over, but left open in front and furnished with seats. In inspecting the track it is pushed in front of a locomotive with the open end forward.

2. Fig. 1710. A hand-car used for very much the same purpose. *Three-wheeled* hand-cars are used by roadmasters for inspection. See *Hand-car*.

**Inspector's lantern**. Figs. 960, 972-3. A general term, commonly meaning some form of bi-colored or tri-colored lantern, with colors changeable at will, usually by means of slides, but sometimes, as in figs. 972-3, by other devices. See *Burrell signal lantern*.

**Interchangeable-hub wheel** (Snow's). Figs. 2163-4. A wheel so designed as to have the tire and skeleton removable, leaving the hub upon the axle. See *Snow's interchangeable-hub wheel*.

**Interchange of traffic** (rules for). A code of rules adopted and amended from year to year, by an organization composed of master car-builders and others, who have held



their meetings during the session of the Convention of the Master Car-Builders' Association. The rules are to provide that each road shall deliver the cars to connecting roads in good running order, and specify (1884) that cars may be rejected for any of the following defects: (a.) Wheels cracked or broken. (b.) Flat spots on wheels exceeding  $2\frac{1}{2}$  inches in length. (c.) Flanges with flat vertical surfaces extending over  $\frac{1}{4}$  inch from tread of wheel. (d.) Flanges less than 1 inch thick. (e.) Wheels chipped on the tread to a depth of more than  $\frac{1}{2}$  inch, or leaving the tread less than  $3\frac{1}{2}$  inches. (f.) Axle journals cut, or less than the following dimensions for various capacities:

60,000 lbs. on 4 axles. $3\frac{3}{4}$ in.	40,000 lbs. on 6 axles. $3\frac{1}{2}$ in.
50,000 " " $3\frac{1}{2}$ "	30,000 " " 3 "
60,000 " on 6 axles. $3\frac{1}{2}$ "	20,000 " " $2\frac{1}{2}$ "

(g.) Brakes not in efficient condition. (h.) Brake wheels, steps, ladders or running boards not securely fastened or in bad condition. (i.) Drawbars or attachments in bad order. (j.) Leaky roofs on merchandise or grain cars. (k.) Spliced centre sills or draw timbers. (l.) Intermediate outside sills spliced in a manner not provided for in the rules. (m.) The general condition of cars considered unsafe to move in heavy trains. (n.) Doors in such condition as to render them unsafe as protection from fire and storms.

**Interior air-holes** (Lorenz refrigerator car). J, figs. 130-130 $\frac{1}{2}$ .

**Interior screw-tube** (of student lamp). O, figs. 852-4. One of a pair of tubes having a screw on them in such manner as to raise or lower the wick by revolving the burner.

**Intermediate floor** (passenger cars). Figs. 199, etc. A floor consisting of boards placed between the sills and between the *deafening-ceiling*, or under floor, and the upper or main floor. Its purpose is to exclude noise and cold. The tendency is to use no other *deadening* material in car-floors.

**Intermediate gear** (of hoisting-gear). 10, figs. 77-78; X, figs. 151-3. One or more shafts carrying additional gear-wheels to give more power and slower motion when the *shifting-pinion*, which see, is shifted into the gear-wheel.

**Intermediate sills.** 3, figs. 82-185. The two main longitudinal timbers underneath the floor between the side-

sills and the centre-sills. When of iron, as A<sub>5</sub>, figs. 144-9. They are usually 8-inch *I-beams*, which see.

**Internal cylindrical gauge.** A very accurately-made solid steel cylinder used as a standard of measurement of cylindrical holes.

**Internal screw-gauge.** Fig. 1833. A solid steel cylinder with a screw-thread on it, for testing the diameter of female screws.

**Internal tire-flange** (steel-tired wheels). Figs. 2163-76. A flange by which the tire is bolted to the wheel-centre.

**Inverted arch-bar** (diamond-truck side frames). 15, figs. 1907-33. A wrought-iron bar which rests on top of the journal-boxes with the *arch-bar*, which see, on top of it. Also sometimes called the *middle or lower arch-bar*, as in logging cars, fig. 1733. See *Centre-bearing inverted arch-bar* (for six-wheel trucks), figs. 1969-70.

**Inverted body-queen-post** (street cars and wrecking cars). B<sub>4</sub>, figs. 144-9; 24, figs. 1843-4. A post in the side of a car-body which supports the *inverted body-truss-rod*.

**Inverted body-truss-rod** (street cars and wrecking cars). B<sub>2</sub>, figs. 144-9; 23, figs. 1843-4. A truss-rod used as a *hog-chain*, which see, to prevent the ends of a car-body from sagging. It rests on two *queen-posts* on top of the sill, and is attached to the latter at each end, bearing against an *inverted truss-rod plate*.

**Inverted truss-rod plate** (street cars). 25, fig. 1843. See above.

**"Invincible" pump.** A special form of basin-pump in which the handle works horizontally instead of vertically. The interior arrangement differs materially from the ordinary basin-pump, over which it is claimed to have certain advantages.

Iron. See Carry-iron.	Safety-beam iron.
Cricket-iron.	Step-iron.
Knee-iron.	Truck-frame knee-iron.
Pull-iron, or switching-iron.	Truss-rod iron.

**Iron body-bolster.** 12, figs. 87-96; 10, figs. 217-9, etc. A body-bolster, which see, of iron, usually made in the form of a truss, consisting of two flat bars, the *body-bolster compression-bar* and *body-bolster tension-bar*. Double iron body-bolsters, which see, are also used.

**Iron car-seat.** Fig. 1136. See *Car-seat*.

**Iron-hopper coal car.** Fig. 21. See *Hopper-bottom car*.

**Iron truck.** A car-truck of which the *side-frames* are

made wholly of iron. See *diamond truck*, which is the principal type. These are often made of iron with wooden transoms and spring-planks, although iron transoms are now used in many cases. Figs. 1907-40 are illustrations of different kinds of iron freight-car trucks, and figs. 1971-3, 1959, of passenger-car trucks, the latter being rarely of iron.

*Italian-hemp bell-cord*. See *Bell-cord*.

## J

**Jack**. See *Jack-screw*, also *hydraulic-jack*, figs. 1884-7; *lamp-jack*, 136, fig. 158; *screw-jack*, fig. 1886; *smoke-jack*, or *stove-pipe jack*, figs. 1486-9; *ventilator-jack*, figs. 1092-4, etc.

**Jacket** (Winslow heater). Figs. 1533 and 1535-7. The outside covering surrounding the stove and affording space between the jacket and stove for the passage of cold air. This part is usually called the *case* or *casing*, which see.

**Jack-screw** (for pile-driver car). 21, figs. 1821-4. A jack-screw working on a *jack-screw pin* attached to the body, for relieving the springs of the cars from action and making the platform a rigid body. Tongs or crabs attached to the track are used to prevent the car body from rising upward when on the jack-screws. Another device for this same purpose is a *bolster jack-screw*, S, fig. 148.

**Jamb** (of a door). 1, fig. 370. The *door-post* on each side of the door proper. *Ash-pit jamb*, which see, is a similar use of the term.

**Janney car-coupler**. Figs. 537-635. A drawbar arranged to couple cars automatically, invented and patented by E. H. Janney in 1870. The outer end of the drawbar is made of a forked or U-shape, and to one arm an L-shaped *knuckle* is pivoted. When the two drawbars come together, the two knuckles engage into each other with a rack and pinion movement, like a pair of teeth in spur wheels. The axis of the drawbar therefore remains always fixed, and does not move sidewise to couple as in the Miller coupler.

When the knuckles engage, the rear point of one or both of them is thrown back, and in its rearward motion it displaces the *catch* 3, fig. 544, which snaps back over the point of hook and secures it in place. The motion

of the catch is controlled by the *catch-spring* 25, which slides on the *catch-spring bolt* 15. The drawbar is cast hollow to contain the knuckle, catch and attached parts.

The buffers are caused to act simultaneously with the coupling-gear, so that the stronger the tension on the latter the stronger the compression on the buffers, by means of the *horn* and *yoke-lever*. The manner in which this is effected is highly ingenious but too complicated for description. The *main draft-spring* 28 acts as a buffer-spring in compression. The *centre buffer-spring* 26 acts as a buffer-spring in either compression or draft. Whether in huffing or in draught the faces of the buffers are always kept in contact; the buffers follow the movement of the coupler forward.

To uncouple, the upper end or handle of the *platform-lever* 24 is thrown toward the centre, and by means of the *pull-rod* 10 operates the catch-lever 22, and unlocks the knuckle 2, permitting the same to swing upon the knuckle-pin 16. A recent improvement is the *Janney-Miller coupler*, which see.

A long list of parts, as follows, are sometimes named with and sometimes without the prefix *Janney*. The following is a substantially complete list of all parts of the Janney and Janney-Miller coupler, except those entitled *combination*, etc., which see:

- Auxiliary draft-spring*. 27, figs. 542-554, 555-601.
- " *Barrel of Janney-Miller coupler*. 40, figs. 542-554, 555-601.
- " *Brake-shaft stand*. 114, figs. 542-54.
- " *Buffer* (flat face). 4, figs. 542-554.
- " (round face). 5, figs. 542-554.
- " *Buffer-guide*. 30, figs. 542-554, 555-601.
- " *Buffer-washer*. 38, figs. 542-554, 555-601.
- " *Catch*. 3, figs. 542-554, 555-601.
- " *Catch-lever*. 22, figs. 542-554, 555-601.
- " *Catch-spring*. 25, figs. 542-554, 555-601.
- " *Catch-spring bolt*. 15, figs. 542-554, 555-601.
- " *Centre buffer-spring*. 26, figs. 542-554, 555-601.
- " *Centre-spring washer*. 32, figs. 542-554, 555-601.
- " *Chafing-plate*. 109, figs. 542-54.
- " *Combination stop-brace*. 115, figs. 542-54.
- " *Yoke*. 9, figs. 542-554.
- " *Coupling-pin*. 17, figs. 542-554, 555-601.
- " *Coupler pin spring*. 94, figs. 555-635.
- " *Coupler pin washer*. 93, figs. 555-635.
- " *Draft-bolt*. 11, figs. 542-554, 555-601.
- " *Draft-iron*. 112, figs. 542-54.
- " *Draft-washer*. 31, figs. 542-554, 555-601.
- " *End-face plate*. 8, figs. 542-554.
- " *Equalizer*. 6, figs. 542-554.
- " *Follower*. 113, figs. 542-554.
- " *Foot-plate*. 7, figs. 542-554.
- " *Fulcrum-bolt*. 12, figs. 542-554, 555-601.
- " *Fulcrum-ferrule*. 35, figs. 542-554, 555-601.
- " *Half-oval washer*. 23, figs. 542-554, 555-601.



- Janney Head.* (Janney-Miller coupler.) 39, figs. 542-554, 555-601.
- " *Horn.* 21, figs. 542-554, 555-601.
- " *Horn-bolt.* 19, figs. 555-601.
- " *Knee-strap.* 111, figs. 542-54.
- " *Knuckle.* 2, figs. 542-554, 555-601.
- " (Old style.) 80, figs. 555-635.
- " *Knuckle-pin.* 16, figs. 542-554, 555-601.
- " *Lever-guard.* 116, figs. 542-54.
- " *Long T-bolt.* 13, figs. 542-554, 555-601.
- " *Main draft-spring.* 28, figs. 542-554, 555-601.
- " *Passenger coupler.* 1, figs. 542-554.
- " *Platform lever.* 24, figs. 542-554, 555-601.
- " " *Jaw.* 33, figs. 542-554, 555-601.
- " " *Pin.* 20, figs. 542-554, 555-601.
- " *Pull-rod.* 10, figs. 542-554, 555-601.
- " " *Button.* 34, figs. 542-554, 555-601.
- " " *Plate.* 36, figs. 555-601.
- " *Short T-bolt.* 14, figs. 542-554, 555-601.
- " *Stirrup.* 108, figs. 542-54.
- " *Tail-pin.* 18, figs. 542-554, 555-601.
- " *Thimble.* 37, figs. 555-601.
- " *Tie-bolt.* 110, figs. 542-54.

**Johnson's self-loading truck.** Fig. 1906. A freight truck with a tong-like horizontal movement of the handles so as to make it easy to grasp a load.

**Joint.** See *Head-joint*, *Scarf-joint*, *Three-way joint*.

**Joint-bolt.** Fig. 1876. A bolt used for fastening two timbers when the end of one joins the side of another. The *lug-bolt*, fig. 1869, is another form for the same purpose.

**Joint-cover.** Fig. 1697. See *Window-moulding joint-cover*.

**Jointed side-pawl** (Creamer brake, which see.) 6, figs. 263-4.

**Jointed top-pawl** (Creamer brake, which see.) 5, figs. 263-4. The reserve power of the spring is communicated to the brake-shaft through this pawl.

**Joint-strip** (of Winslow roof). 1, figs. 670-672½. A strip of wood with rabbeted grooves for inserting the corrugated *roof-sheets*. A *cover-strip*, fig. 664, is a U-shaped strip of metal for uniting flat roof-sheets.

**Journal** (M. C. B. standard). E, figs. 1974-5. The part of an axle or shaft on which the *journal-bearing* rests. A *gudgeon* is a rough form of journal, usually of wood with an iron strap around it, as for the mast of a derrick or crane. The journals of bodies of irregular shape, like cannon or leaders of pile-driver cars, are more commonly designated *trunnions*, which see. For standard minimum dimensions for various roads, see *Interchange of traffic*.

**Journal-bearing.** Figs. 1982-2002. A block of metal,

usually some kind of brass or bronze, which see, in contact with a journal, on which the load rests. In car construction the term when unqualified means a car-axle journal-bearing. A standard form has been adopted by the Master Car-Builders' Association, and is shown in the engravings, but its composition is not specified. The *Hopkins* or *lead-lined* journal-bearing is one coated on the inside with a thin sheet of lead to take up minor inequalities. *Babbitt-metal* in some of its many forms is used for car-journal bearings occasionally, and almost universally for the bearings of machinery. In order that the journal-bearing may be more easily removable, and to distribute the load more equally, a *journal-bearing key*, also called a *wedge*, *liner*, *slide*, *saddle*, *keeper*, etc., is used to hold the journal-bearing in place. The term "wedge" is in very common use, perhaps more common than the name here given. To remove the brass a *car-box jack*, fig. 1836, is used to take the load off the bearing by inserting it under the journal-box, when the wedge or key can be readily removed, and afterwards the bearing itself. See *Stop journal-bearing* and *stop-key journal-bearing*.

**Journal-bearing key or wedge.** 8, figs. 2002-3. M. C. B. standard, figs. 1997-2001. See above.

**Journal-bearing stop-key.** 27, figs. 105-6; figs. 2007-9. A journal-bearing key with a projection to which a *stop-plate* is attached to restrain lateral play, so that a collar on the axle may be dispensed with.

**Journal-box.** Figs. 1997-2020; 3, figs. 1907-69. A cast-iron box or case which incloses the *journal* of a car-axle, the *journal-bearing* and *key*, and which holds the *packing* for lubricating the journal. Also called an *axle-box*, *car-box*, *grease-box*, *housing-box*, *oil-box* and *pedestal-box*. English, usually *axle-box*.

The weight of the *Master Car-Builders' standard* journal-box, figs. 1997-2001, is 74 lbs. All car journal-boxes are *outside-bearing*. In certain trolley or push-cars however, as in fig. 1773, and also in locomotive trucks, *inside-bearing* journal-boxes are used. To dispense with the need of a collar on the axle, various devices, like the Raoul journal-box, fig. 2014, as well as stop-key and stop journal-bearings have been introduced, but their use is not general.

**Journal-box cover, or lid.** 4, figs. 1907-66, 2002-20. A door or lid covering an aperture on the outside of a

journal-box, by means of which oil and packing are supplied and journal-bearings are inserted or removed. Such covers are usually made of cast-iron, sometimes of wood. They are sometimes closed by a spring, as in fig. 2013, or the *Fletcher* lid, which see, and sometimes not, as in the *Hewitt* lid, figs. 2115-7.

**Journal-box cover bolt.** A bolt used to fasten covers which have no hinge to the box. Two of these are usually employed to each cover. A *gasket* of canvas, rubber or leather is used to make a tight joint. Journal-box covers are, however, now almost invariably held on by hinges and springs or some arrangement of lugs or grooved joints.

**Journal-box cover gasket.** Nearly obsolete. See above.

**Journal-box-cover hinge-pin.** 12, figs. 2002-3.

**Janney-Miller coupler.** Figs. 554-635. A modification of the Janney coupler so as to enable it to be rapidly changed into an equivalent to the Miller coupler, thus enabling cars provided with it to be run in connection with either Janney or Miller draw-gear. The principal changes to effect this end were as follows :

A joint was made in the barrel of the ordinary Janney coupler to provide for the removal of the head when it was desired to change to the Miller. There was added the part called the *centre buffer-yoke* in order to provide a connection between the centre buffer spring and centre buffer when used as a Miller coupling, the same springs being used, whether in use as a Janney or as a Miller coupler.

A spiral spring called the *side-spring*, with its bracket and clevis, was added to give the necessary side resistance to the Miller hook. The platform-lever was lengthened for the purpose of conforming to the difference in heights between the Janney catch-lever and the chain by means of which the Miller hook is moved in uncoupling, the same lever serving for either draw-gear. Followers and guides were provided and placed back of the centre buffer-spring to form a better base for that spring when used in connection with the Miller buffer.

The Miller stop 43 was added to the Janney platform.

After a little practice the change from the Miller to the Janney gear is made in from two to five minutes.

**Jaw.** See *Drawbar jaw*, 16, figs. 395-7, *Pedestal-jaw*, figs. 2021-5.

**Jaw-bit.** 77, fig. 2025 ; 5, fig. 1843. A bar extending across the mouth of a pedestal jaw underneath a journal-box and bolted to the horns of the pedestal.

**Jaw-bolt.** Fig. 1791. A bolt with a U-shaped split head, perforated to carry a pin. Used largely as a *brake-lever fulcrum* on brake-beams.

**Jaw-spring.** A *journal spring*, which see. Figs. 2026, 2091.

**Jeffrey "Railroad Speeder."** Fig. 1717. A hand-car of quite new design which uses the power of the legs, by means of a treadle movement, instead of the arms, as a motive power. It has as yet only been applied to light inspection uses, but is claimed to be very light running and with apparent justice, as the motion is beyond doubt that by which man can exert the greatest amount of power with the least fatigue.

**Jib** (of a derrick or crane). Figs. 144-5, etc. More properly *boom*, which see.

**Johnson heater.** Fig. 1472. One of the class of heaters which rely upon circulating a hot fluid through radiating pipes passing under the seats and side of the car. The fluid used is a solution of *glycerole of calcium* which boils at 236° Fahr., and which is said not to congeal at a temperature of 45° below zero, but water is also used. It is a *base-burning* heater, which see.

**Journal-box-cover spring.** 1. 13, figs. 2002-3. A flat spring to hold the lid in place. Various journal-box lids are in use, as the *Hewitt*, which see, which dispense with a spring.

2. (For *Fletcher* journal-box lid, which see.) Figs. 2019-20. A spiral spring slipping over a sleeve which slips over the bolts. The drawing is not quite correct, as it does not show this sleeve and does show a pin not used.

**Journal-box guides.** 99, fig. 1959. Iron bars or blocks placed one on each side of the journal-boxes of some iron frame trucks in which *journal-springs* are used. These irons, while holding the box in place longitudinally and transversely, allow it to have a vertical motion between them. When a pair of these guides is cast in one piece it is called a *pedestal*, which see.

**Journal-box lid** (*Hewitt's*, which see). Figs. 2015-17. See also *Journal-box cover*.

**Journal-brass.** A *journal-bearing*, which see.

**Journal distance-gauge.** Fig. 2118. One of the M. C. B.



standard gauges to determine the distance apart of the two journals.

**Journal length and diameter gauge.** Fig. 2116. One of the M. C. B. standard gauges.

**Journal-packing.** 14, figs. 2002-3. Waste, wool, or other fibrous material saturated with oil or grease, with which a journal-box is filled to lubricate the journal. Various forms of patent packing have also been introduced, among which are the *elastic fibre packing*, *patent waste*, and *jute*, which see.

**Journal shoulder-gauge.** Fig. 2115. One of the M. C. B. standard gauges, serving the purpose which its name implies.

**Journal-spring.** Fig. 2091; 2, fig. 2026; 78, figs. 1942-50, etc. A spring now rarely used, supporting part of the weight of a car which is placed directly over the journal, and which usually rests on the journal-box under the truck-frame. Such springs are sometimes placed above the truck-frame and supported by straps, and the weight of the car is transmitted to the journal-box by a vertical pin or stirrup, as in fig. 1959. *Equalizer-springs*, which see, accomplish the same end in six-wheel trucks as journal-springs, and more effectually.

**Jute.** A coarse fibre raised in India for making gunny-bags, matting, ropes, etc. It has been recently used for making journal-packing by a patented process.

## K

**"Kalamazoo" lever hand-car.** Fig. 1715; figs. 1724-26. An improved hand-car, the novel features of which are the double *propelling-levers*, which prevent any dead-centre, and the lightness and strength obtained by the use of gas-pipe framing.

**"Kalamazoo" three-wheeled hand-car.** Fig. 1714. A very light and easy running inspection hand-car for the use of one or two men only.

**Kalamined iron.** Sheet-iron, coated with an alloy of  $\frac{1}{16}$  zinc, lead, tin and nickel in the proportion of 29 lbs. of tin, 50 to 75 lbs. of zinc, 100 lbs. of lead, and three to six ounces of nickel. The alloy melts at a lower temperature than common zinc, and is claimed to give a more durable compound as well as a thinner and more adhesive coating. *Galvanized iron* is sheet-iron coated in the same way with pure zinc.

**Keeper.** "A ring, strap, pocket, or the like device for detaining an object; as

1. "A jamb nut.

2. "The box on a door-jamb into which the bolt of a lock protrudes when shot, as figs. 1020-4, etc. When the keeper is for a beveled *latch* bolt, which is moved by contact with it, it is more commonly called a *strike-plate*, as figs. 1254, 1628, etc. They are also further designated by the name of the lock or latch which they accompany.

3. "The latch of a book, which prevents its accidental disengagement."—*Knight*.

**Keg-shaped spiral-spring.** Fig. 2050. A spiral spring, the form of which resembles a keg or cask, patented by W. P. Hansell in 1876. Its object is to obtain a *graduated* spring, which see.

**Key.** 1. "In a *general sense*, a fastener; that which fastens; as a piece of wood in a frame of a building."—*Webster*. Hence a pin inserted in a hole in a bolt, and used to secure the bolt or its nut. A *split-key*, which see, is a special form.

2. Figs. 1011, 1029, 1178, etc. "An instrument for opening or shutting a lock by pushing the bolt one way or the other."—*Webster*. See *Lock*.

3. A block over the top of a journal-bearing, called in full *journal-bearing key*. Figs. 1982-92, etc., which see. This part is also very commonly called a "wedge."

4. A beveled bar used with a *gib* to form a *gib and key*, which see. See also *King-bolt key*.

5. (For coupling-valve of Westinghouse brake.) 48, fig. 311. A kind of wrench having pins fitting into corresponding cavities.

6. (For lamps and valves of Pintsch gas apparatus.) Figs. 821-3. A substitute for the ordinary cocks of gas fixtures to prevent unauthorized tampering.

**Key-bolt.** Fig. 1871. A bolt slotted near the end to receive a key (1, see above), which takes the place of a nut.

**Key-hole plate.** An *escutcheon* or *escutcheon-plate*, which see.

**Key-pin** (of a lock). L, figs. 1029-30. The pivot on which the key turns when inserted in the lock.

**Key-ring tire fastening.** 30, fig. 116 and fig. 2156. A mode of securing the tire to the wheel, composed of **two** rings, one of U section, and the other nearly rectangular.

The former ring holds tire and wheel together, and the latter ring holds the former in place, filling up the groove in the tire. When both rings are in place the outer tip of the groove in the tire is slightly hammered over, thus gripping the second or key-ring, and retaining it in place. The *Carlton & Stroudley* fastener, which see, is the most used of this class of fastening. See also *Tire fastening*.

**King-bolt, or centre-pin.** 9, figs. 215-7; 18, figs. 82-92; 16, figs. 132-85. A large bolt which passes through the truck and body-bolsters and centre-plates of a car-body and the centre of a truck. It is accessible from the floor of the car by removing the *king-bolt plate*. The truck is supposed to swivel on the king-bolt, but in reality the two centre-plates normally carry all the strain. In some wrecking cars, as at **K**, figs. 144-8, the king-bolt is provided with *keys* to bind the truck to the car so that they cannot be separated from each other.

**King-bolt key** (wrecking cars). **K<sub>4</sub>** and **K<sub>5</sub>**, figs. 146-148. See above. They are distinguished as the *upper* and *lower* key.

**King-bolt plate.** 17, figs. 155-85; 10, fig. 215. See above.

**King-post** (of a truss). 5, fig. 2131, etc. A single post or distance-piece between a *truss-rod* and the *chord* of a truss or beam. If two such posts are used they are called *queen-posts*. In car construction king-posts are made in two ways; one adjustable, so that they may be lengthened or shortened, and the other without adjustment. Also see

*Brake-beam king-post.*      *Cross-frame king-post.*  
*Truck-bolster king-post.*      *Truck-frame king-post.*

**Kirby's car-door lock.** Figs. 1003-4. A device to give a lock extra strength and durability and to dispense with the use of screws for fastening on the door-knobs.

**Kirtley double-spoke wheel.** Figs. 2162-5. A railroad wheel, the hub (hoss) spokes and rim of which are composed wholly of wrought iron welded together, the tire being shrunk on and secured by *Mansell retaining-rings*, which see, or other devices. The spokes are rolled in flat bars of varying thickness, and are bent into a triangular form, each triangle ultimately forming two spokes and a segment of the rim. The apexes of the triangles are welded to the hub, and the angles at the base of the triangle are welded together to form a continuous wrought-iron rim. This wheel is an improved form of

that shown on figs. 2179-80, and is largely used on both freight and passenger service in Europe, and to a lesser extent in this country.

**Kitchen** (dining car). Figs. 193, 211, 214. A large compartment at one end of the car provided with all the facilities of a well-organized kitchen. In the earlier dining cars no cooking was done on the cars, and the kitchen simply had facilities for keeping the food hot. Officers' and other private cars are commonly provided with a kitchen smaller than in dining cars and usually at the extreme end.

**Knee-timber** (Janney platform). Figs. 543, etc. A deep *platform-sill*, cut away to embrace the end-sill.

**Knee.** See *Platform-hood knee*.

**Knee-iron.** An L-shaped or angle-iron casting or forging which is fastened to the corner where two timbers are joined to strengthen the joint. See *Sill knee-iron*, *Truck knee-iron*.

**Knee-strap** (Janney coupler). 111, figs. 542, 554. A wrought-iron facing to the knee-timbers, connecting the end-sill and the stirrup or drawbar carry-iron.

**Knob.** See *Berth safety-rope knob*, *Door-knob*, *Window-curtain knob*.

**Knob-escutcheon.** Figs. 1002, 1025. A *Door-latch rose*, which see.

**Knob sash-lift.** Fig. 1671. See *Sash-tift*.

**Knob-shank.** Fig. 1007. A *door-lock spindle*, which see.

**Knotted spiral seat-spring.** Fig. 1228. One with the loose ends of the wire tied. See *Seat-spring*.

**Knuckle.** 1. (Janney coupler.) 2, figs. 542-54, 555-601. The rotating coupling-hook by means of which coupling is effected when the knuckle is locked by the Janney *catch*.

2. (Of a hinge.) Figs. 779-789. The central tubular projections which carry the hinge-pin. The term is of wide and general application in mechanics to many similar parts.

**Knuckle-joint.** "A joint in which a projection on each leg or leaf of a device is inserted between corresponding recesses in the other, the two being connected by a pin or pivot on which they mutually turn. The legs of dividers and the leaves of door-hinges are examples of true knuckle-joints. The term, however, has been somewhat commonly restricted to *compound* or *universal* joints designed to act in any direction."—*Knight*,



Among the applications of this joint which have been made in car building are gas-pipe knuckle-jointed tubes to be used instead of rubber for brake-hose. They are not yet in general use.

**Knuckle-pin** (Janney coupler). 16, figs. 542-554, 555-601. The steel pin connecting the knuckle to the jaws of the coupler.

**Kohler stove**. Fig. 1473. A car stove of no especial novelty except in respect to the *safety-ball*, which is carried upon lugs within the stove pipe, to prevent escape of the fire in case of overturning.

# L

**Label-holder** (postal-car). Figs. 1070, 1076-7. Made both *single* and *double*. Sometimes combined with a drawer-pull.

**Lace** (English). See *Broad lace*. *Pasting lace*. *Seaming lace*.

**Ladder**. 1. 59, figs. 86-96, 656-7, etc. Bars of wood or iron attached to the side or end of a box-car so as to form steps by which persons may climb to and from the top of the car.

The individual bars, whether of wood or iron and whether round or square, are termed *ladder-rounds*. They are sometimes made with, but usually without, *ladder side-rails*, which see. The handles alongside of the ladder are termed *grab-irons*, or sometimes *corner-handles*; that placed on the roof near the ladder, the *roof grab-iron* or *ladder-handle*.

The M. C. B. Association has recommended, figs. 656-7, "That each box and stock car have two ladders, not less than five steps in each ladder, made of  $\frac{5}{8}$  in. round iron, projecting  $3\frac{1}{2}$  in. from the siding, securely fastened to each end at diagonal corners, with a handle directly over the ladders on the roof."

Also that a *bent ladder-round*, which see, be used as a safeguard against the foot slipping sidewise, for the bottom round.

2. (For pile-driver car.) 32 and 33, figs. 1821-4. A means of approach to the upper end of the leaders. They usually swing on *ladder-trunnions* so as to be dropped on the roof of the cabin when the car is not in use. There is usually also a *cabin-ladder* against the side of the cabin or engine-house.

**Ladder-handle**. 9, figs. 252-4; 60, figs. 86-96; figs. 656-7, etc. A *roof grab-iron*, which see.

**Ladder-rod**. An iron *ladder-round*.

**Ladder-round**. 2, fig. 9; 59, figs. 86-96, etc. See *Ladder*.

The lower round of the ladder by recommendation of the Master Car-Builders' Association should be a *bent ladder-round*, as 59', fig. 96, as a safeguard against the slipping of the foot in swinging around the corner of a car.

**Ladder side-rails**. 202, figs. 97-101. The wooden vertical side pieces to which wooden or iron ladder-rounds are attached. This form of constructing the ladder, however, is less common than ladder-rounds directly screwed to the end of the car, as in fig. 96.

**Lag-screw** (English, coach-screw). Fig. 1868. An iron bolt with a square or hexagonal head and with a wood screw-thread cut on it, intended to screw into wood. Lag-screws are round under the head, so that they can be turned after they enter the wood.

**Lambrequin** (lam'-brě-kăn). 28, fig. 695. A cloth or drapery fastened over the upper part of a window. It covers the rod and rings or roller of the window curtains. Lambrequins are unfashionable and passing out of use.

**Laminated buffing-spring** (English). A half-elliptic spring. See *Plate buffing and draw spring*.

**Lamp**. Figs. 828-71. "A vessel for the combustion of liquid inflammable bodies for the purpose of producing light."—*Webster*. The chief forms of lamps now used are for burning mineral oil or petroleum, though *candle lamps*, which see, are in occasional use, as also *oil lamps* for lard oil, for panel lights, lanterns, etc. Car lamps are distinguished as *side-lamps* and *centre-lamps*, the latter now usually consisting of two or more distinct lamps, forming a *chandelier*. In England *roof-lamps*, inserted from the roof of the car, are exclusively used. Lamps are also distinguished as *adjustable globe*, *loose globe* and *plastered or fixed globe*, which see, the latter being a form in which the lamp is removed from below and the globe cannot be taken off. Many of the more elaborate modern lamps are constructed upon the *tornado* or *hurricane* principle, which see, to avoid the effects of draft. *Postal-car lamps* or *chandeliers* are a special class, in which every means possible is used to obtain a powerful light. See also *Alcove-lamp*, *signal-lamp* and *tail-lamp*.

**Lamp-alcove.** Figs. 855, 864. A metal casing or lining for a recess in the side of a car to contain an *alcove-lamp*, which see.

**Lamp-arms.** 4, figs. 827 $\frac{1}{2}$ -83. 843; 26, figs. 680-1. Rods by which a lamp is attached to the ceiling of a car. Some lamp-arms, as in fig. 830, have bracket-angles to support the shade and are then called *bracket-arms*.

**Lamp-base** (Moehring argand lamp). D, figs. 849-50.

**Lamp-bottom.** Figs. 903-6; 20, figs. 827 $\frac{1}{2}$ -71; E, figs. 849-50. The lower portion of a lamp which is removable. Contains the wick, burner and oil. See *Candle-bottom*.

**Lamp-bracket.** 17, figs. 851-71, etc. See *Side-lamp bracket*.

**Lamp-burner.** Figs. 872-925; 8, figs. 872 $\frac{1}{2}$ -71, 873-93. That portion of a lamp by which the opening on the top of the reservoir is closed, which holds the wick, and by which the latter is adjusted. A great variety of styles exist and are shown. See engravings. The *dual burners*, which see, are favorites for car service were a brilliant light is wanted, but many forms are used.

**Lamp-burner** (English). 165, fig. 205. The wick holder in the *roof-lamp*, which see.

**Lamp-canopy.** Figs. 940, etc. A larger and more elaborate *smoke-bell*, which see.

**Lamp-case** (street cars). 74, figs. 1843-4. A box over the end windows in which a lamp is placed. It has a glazed door on the inside and usually colored glass on the outside as a signal or to designate the line to which the car belongs. It is fastened shut by a *lamp-case hook* and *eye*.

2. (English.) 160, fig. 205. A cylindrical sheet of iron for the protection of the *roof-lamp*, which see.

**Lamp-case base or packing** (English). 167, fig. 205. A wooden packing-piece secured to the roof-boards, and presenting a level face for the *lamp-case*. See also *Roof lamp*.

**Lamp-case chimney** (street cars). 76, figs. 1843-4. A metal pipe through which the smoke and gases escape from a lamp-case, very similar to a *lamp-jack*, which see.

**Lamp-case door** (street cars). 75, fig. 1844. See *Lamp-case*.

**Lamp-case door-holder.** Fig. 1862. A kind of hook attached to the roof.

**Lamp-case eye.** Fig. 1860. See *Lamp-case*.

**Lamp-case hook.** Fig. 1860. See *Lamp-case*.

**Lamp-chimney.** A glass tube which incloses the flame of a lamp, conducts away the smoke and gases and produces the necessary draft.

Figs. 926-936; 10, figs. 827 $\frac{1}{2}$ -871 give what are known as the standard types, of which the following table gives the principal dimensions in inches:

	Ht.	Diameter.				No. in a case...
		Largest.	Top....	Bottom.	Neck....	
1. Same shape as No. 2, For No. 1 or A dual burner.....	7	2 $\frac{1}{2}$	1 $\frac{3}{8}$	1 $\frac{1}{4}$	....	Doz
2. No. 2 or B dual, Taber, monarch, Alex'n and Rich'd burners....	8	2 $\frac{7}{8}$	1 $\frac{1}{8}$	2 $\frac{1}{8}$	....	6
3. No. 2 or B dual, Taber, monarch, Alex'n and Rich'd burners....	8 $\frac{3}{4}$	3 $\frac{7}{16}$	1 $\frac{3}{4}$	2 $\frac{1}{8}$	....	6
4. No. 16 postal-lamp (for signal and sperm oils).....	10 $\frac{3}{4}$	1 $\frac{3}{4}$	1 $\frac{1}{4}$	1 $\frac{1}{4}$	2 $\frac{1}{8}$	12
7. Student lamp.....	11	1 $\frac{1}{2}$	1 $\frac{1}{4}$	1 $\frac{1}{8}$	2 $\frac{1}{4}$	25
8. Astral, brilliant and other argand burners....	10 $\frac{1}{4}$	1 $\frac{3}{4}$	1 $\frac{1}{4}$	1 $\frac{1}{4}$	2 $\frac{1}{8}$	25
9. No. 16 postal-lamp (for mineral, seal and other 300° oils).....	10 $\frac{1}{4}$	1 $\frac{3}{4}$	1 $\frac{1}{4}$	1 $\frac{1}{4}$	2 $\frac{1}{8}$	25
10. Moehring argand burner.....	11	2	1 $\frac{1}{4}$	2	....	12
11. Mammoth argand burner.....	12	2 $\frac{3}{8}$	1 $\frac{1}{8}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$	6
12. No. 2 or B sun burner.....	8	3	1 $\frac{3}{4}$	3	....	6
13. No. 1 or A sun burner.....	7 $\frac{1}{4}$	2 $\frac{1}{2}$	1 $\frac{1}{4}$	2 $\frac{1}{4}$	....	6
14. No. 2 or B sun hinge burner....	8 $\frac{1}{4}$	3 $\frac{3}{4}$	3	2 $\frac{3}{8}$	....	6
15. No. 1 or A sun hinge burner....	7 $\frac{1}{8}$	3 $\frac{3}{8}$	....	2 $\frac{5}{8}$	....	6
16. No. 1 or A sun hinge burner....	7 $\frac{1}{8}$	3 $\frac{3}{8}$	1 $\frac{1}{2}$	2 $\frac{5}{8}$	....	6
17. No. 2 or B sun hinge burner....	8 $\frac{1}{8}$	3 $\frac{3}{4}$	....	2 $\frac{5}{8}$	....	6
18. Same burners as No. 2.....	8 $\frac{3}{4}$	3 $\frac{7}{16}$	1 $\frac{1}{2}$	2 $\frac{1}{8}$	....	6
23. No. 0 or E sun hinge burner (see cuts Nos. 14 and 16).....	6	3	2 $\frac{1}{8}$	1 $\frac{1}{8}$	....	6
24. No. 3 or D dual burner.....	10	3 $\frac{1}{8}$	1 $\frac{3}{4}$	2 $\frac{5}{8}$	....	6
25. Same as No. 2, with larger bulge, fits same burners.....	....	....	....	....	....	6

For names of the various patterns as referred to by number, see engravings.

**Lamp-chimney bracket.** 12, figs. 857-8. A projecting metal arm attached to the side of a car and carrying a *chimney-holder* by which a lamp-chimney is held in place.

**Lamp-chimney holder.** 11, figs. 843, 857. See above.

**Lamp-chimney reflector.** 15, figs. 843, 857. Usually it has a hole in the centre in which the chimney is inserted.

**Lamp-cover, or lamp-protector** (English). 161, fig. 205



American equivalent, *lamp-jack*. A sheet-iron cover hinged to the lamp-case and secured by a *spring-catch* to protect the lamp from rain, while it allows the smoke to escape. See also *Roof-lamp*.

**Lamp-cover spring-catch** (English). 164, figs. 204-5. See above.

**Lamp-fastening**. Fig. 847. See Creamer's lamp fastening.

**Lamp-fount**. 6, figs. 827½, 847, 857, 865-6. The receptacle for the oil burned in a lamp. Also called *lamp-reservoir*.

**Lamp-glass** (English). 166, fig. 165. In a carriage, a hemispherical glass globe of unusual thickness, which surrounds the burner of a *roof-lamp*, which see.

**Lamp-globe**. Figs. 848-53. A glass or porcelain case or vessel inclosing or surrounding the flame of a lamp or candle, and intended to protect the latter from wind. Lamp globes are approximately globular in form, in distinction from a *lamp-shade*, which flares at the bottom, but are often made of different shapes, as *round*, *pear-shaped*, *egg-shaped*, *melon-shaped*, *double-cone-shaped*, etc.

**Lamp-globe chimney**. 3, figs. 828-33, 868. A metal tube attached to the top of a lamp-globe for conducting away the smoke. A *shade-cup* is an equivalent device for a lamp-shade.

**Lamp-holder**. See *Side-lamp holder*.

**Lamp-hoop**. Figs. 918-21. A ring with an interior screw-thread for attaching to cheap oil lamps to receive the burner.

**Lamp-iron** (English). American equivalent, *tail-light holder*, or signal-light holder. See *End lamp-iron*, and *side lamp-iron*.

**Lamp-jack**. 136, fig. 158; 27, figs. 676-7. A cap or covering over a *lamp-vent* on the outside of a car to exclude rain and prevent downward currents of air. Also see *Lamp-case chimney*.

**Lamp-key** (Pintsch gas apparatus). Fig. 821. A substitute for the ordinary cock of gas fixtures used to prevent unauthorized tampering with the burners.

**Lamp-platicum** (Ccollargh's). Figs. 1180-1. A sliding or lifting step attached to car-seats for convenience in lifting or adjusting centre-lamps.

**Lamp-plug** (English). 162, fig. 205. A cylindrical piece of wood secured to the lamp-case by a chain, and used to

block up the lamp aperture in the roof when the lamp is not in its place. See *Roof-lamp*.

**Lamp-plug stand** (English). 163, fig. 205. A cast-iron stand on which the *lamp-plug* rests when the *roof-lamp* (which see) is in use. Its object is to prevent the lamp-plug bumping on the roof of the carriage when the train is moving.

**Lamp-reflector**. 14, figs. 828-33, 856. See also *Alcove-lamp reflector*.

**Lamp-reservoir**. 6, figs. 827½, 857, 905-6. The portion of a lamp which holds the oil. Also called *lamp-fount*.

**Lamp-ring**. 5, figs. 827½-33, 843. A metal ring at the base of a lamp, to which the lamp-bottom or reservoir and lamp-globe are attached. In centre-lamps the ring is supported by the lamp-arms. See also *Creamer's lamp-fastening*.

**Lamp-screw**. Figs. 914-21. A more elaborate *lamp-hoop*, which see, with a flange.

**Lamp-shade**. 2, figs. 942-8. A conical-shaped reflector placed over a lamp to reflect the light downward.

Figs. 942-948 give what are known as standard forms, the dimensions of which in inches are as per the following table:

	Ht.	Diameter.	
		Bottom.....	Top.
			Inside... Outside..
4. Car lamp—Cone, plain white.....	4	8½	4½ 4½
5. " " " ".....	4½	10	4½ 4½
6. " " " ".....	4½	14	5½ 6½
6. " " " gold striped....	4½	14	5½ 6½
7. " " " ".....	7½	16½	5½ 6½
7. " " " plain white....	7½	16½	5½ 6½
8. " " F. R. " ".....	5½	10	2½ 3½
8. " " " gold striped....	5½	10	2½ 3½

**Lamp-stay**. 1, figs. 828-33. A horizontal bar, usually reaching from side to side of the clear-story, by which a car-lamp is steadied and also made more ornamental.

**Lamp-vent**. An opening in the roof through which the gases from a lamp escape.

**Lantern.** Figs. 959-86. A portable lamp, the flame in which is protected from wind and rain by glass, usually in the form of a globe surrounded by wires called *guards*. According to the number of these wires the lantern is called *single*, *double*, or *triple-guard*. The *conductor's lantern*, which see, is one with a large bail, so as to be carried on the arm, leaving both hands free. It is usually provided with a *reflector* above. *Fresnel lanterns*, fig. 936, are little used for railroad service, the various forms of *signal lamps*, figs. 959-73, being generally preferred. *Inspector's lanterns*, which see, are technically understood to be those in which the color of the light can be varied at will. See *Lens*. *Signal-light*.

**Lantern and flag holder** (Coolbaugh's). Figs. 965-8. A device for displaying signals on rear of trains. See *Flag-holder*. The novelty is the convenience of attachment for either a lamp or flag.

**Lard-oil lamp-bottom.** Fig. 906.

**Lard-lamp screw.** Fig. 914.

**Lard-oil ratchet-burner.** Fig. 913.

**Large equalizing-guide** (Janney-Miller coupler). 47, fig. 554. See *Equalizing-guide*. *Small equalizing-guide*.

**Larry.** Figs. 1713, 1730. See *Lorry*.

**Latch.** The primary sense of this word is—to catch, to close, stop, or make fast; hence, an attachment to a door, window, etc., to hold it open or shut, is called a latch. The ordinary distinction between a latch and a lock is that a lock is closed and opened with a separate key and usually has a square bolt, whereas a latch has no separate key and usually has a beveled bolt which snaps shut automatically by contact with the *keeper* or *strike-plate*. The most exact distinction between a latch and lock seems to be the form of the bolt and not the use or disuse of a key. See *Sash-lock*. Latches named from the use which they subserve are the following, which see:

<i>Berth-latch.</i>	<i>Saloon-latch.</i>
<i>Deck-sash latch.</i>	<i>Sliding door-latch, or lift-latch.</i>
<i>Safety berth-latch.</i>	
<i>Safety grate-latch.</i>	<i>Spring door-latch.</i>
<i>Safety strap-latch.</i>	

A *sliding door-latch* or *lift-latch* has a beveled hook instead of a beveled bolt, but operates upon substantially the same principle. Nearly all forms of latches are *spring latches*. A *night-latch* is a large and a fully

made form of an ordinary latch, which can be opened from the outside by a key. A *cupboard latch* is any form of small latch. A *rim-latch*, like a rim-lock, is one attached simply to the outside of the door in distinction from a *mortise* or *rabbeted latch* (both rarely used), which is boxed into the door.

**Lateral motion.** A movement sidewise, more particularly meaning, as generally used, a side or *swing motion* (which see) of the bolster of a swing-motion truck, in distinction from the *end-play* of an axle under the journal. A *lateral-motion spring*, which is slipped over a *lateral-motion spring-pin*, is sometimes used to check the lateral movement of such spring bolsters, but this end is more commonly accomplished by splaying the swing-hangers outward.

**Lateral-motion spring.** 40, figs. 1934, 1937. See above.

**Lateral-motion spring-pin.** 41, fig. 1937. See above.

**Lateral-play.** Side motion of any part of a car or machinery; the space left to permit of such side-motion. See *Lateral-motion* (of a truck bolster). *End-play* (of an axle).

**Laurie car.** Figs. 1713, 1730. See *Lorry car*. The lorry car is often spelled Laurie on the supposition that the car was named after James Laurie, a prominent American engineer in the early days of railroads, but the term is English and very old.

**Lavatory.** Figs. 203, etc. Another name for a *saloon*, especially when provided with washing facilities; also used, more properly, as another name for a *wash-room*.

**Lavatory carriage** (English). A passenger vehicle in which two or more compartments have access to a small lavatory, urinal, etc. See also *Carriage*.

**Lead car-seal.** Figs. 1110-13. Lead seals are either in the form of rivets or buttons. The former now more common. See *Car-seal*.

**Leaders** (of pile-driver car, which see). 3, figs. 1821-4. The long vertical timbers serving to guide the *hammer* (which see) in its fall. The leaders swing upon *leader trunnions* carried on the *leader-trunnion pedestal*. They are stiffened at some point midway of their length by *top-stringers* 6, *leader-braces* 7, and commonly by *pi lasters* 5, at the outside which latter serve to support the top-stringers. They are connected at the top by *leader cap* and at the bottom by a *leader cross-piece* the



- latter attached at the side in such manner as not to interfere with the fall of the hammer.
- Leader-brace** (pile-driver car). 7, figs. 1821-4. See above.
- Leader-brace pocket** (pile-driver car). 17, figs. 1821-4. See above.
- Leader-cap** (pile-driver car). 9, figs. 1821-4. A cross-piece connecting the two leaders at the top and carrying the *main-sheave* and *pile-hoisting sheave* of the hoisting-gear.
- Leader cross-piece**. 23, figs. 1821-4. See *Leader*.
- Leader-stay**. 25, fig. 1824. An oblique diagonal brace attached at the upper end to the *top-stringers* serving to stiffen the leaders.
- Leader-trunnion**. 15 and 51, figs. 1821-4. See *Leader* and *trunnion*.
- Lead-lined journal-bearing**. A journal-bearing which has its inner surface covered with a *thin* layer of lead, so that it may fit itself to the journal as soon as subjected to wear. Such hearings were patented by Mr. D. A. Hopkins, and are often called *Hopkins journal-bearings*. A variety of other bearings, such as the *Le Roy*, etc., are more or less similar, but most of them use a greater quantity of lead or *babbitt-metal*, which see, as fig. 1995.
- Lead-rivet car-seal**. Fig. 1114-18. See *Car-seal*.
- Lead seal**. Figs. 1109-19. See *Car-seal*. *Lead car-seal*.
- Leaf spring** (for Miller coupling). 49, fig. 636. Also called *coupling-spring*. The long spring pressing the *drawbar coupling-hooks* together in the act of coupling.
- Leakage-groove** (of Westinghouse brake cylinder). b, fig. 352. A small passage past the brake piston to prevent any trifling leakage applying the brakes.
- Leakage-valve** (Westinghouse brake). Fig. 320. A small valve formerly placed between the triple-valve and the brake-cylinder to prevent a trifling leakage applying the brakes. Superseded by the *leakage-groove*.
- Leather**. See *Piston-packing leather*. *Packing-leather*. *Piston-rod-packing leather*. *Window-shade leather*. *Solid leather nails*.
- Leather bell-cord**. See *Bell-cord*.
- Leatheroid**. A substance somewhat resembling leather, and somewhat similar to *vulcanized fibre*, which see, in its general character and appearance. It is made by a quite different process, however, treating paper with sulphate of zinc, and is claimed to be a cheaper and inferior article. The two are, in the main, used for quite different purposes.
- Leather-seat**. A *dust-guard bearing*, which see.
- Left-chamber cap** (air-pump for Westinghouse brake). 30, fig. 299.
- Left-hand brace-pocket**. See *Pocket*. A right-hand pocket is shown at 40, figs. 132-6. If the brace were on the other side of the post and inclined the opposite way, the pocket would be left-hand.
- Left-hand seat**. Figs. 1134-5. A car-seat with a stationary back in such a position that the seat-end is on the left side of a person sitting on the seat.
- Leg**. See *Seat-leg*.
- Leg-iron** (English). 173, figs. 205-7. See *Step-iron*.
- Length** (of elliptic springs). The distance from centre to center of *scrolls* when the spring is unloaded.
- Lens**. Figs. 954-5. An optical instrument for conveying rays of light upon a fixed path or fixed point. Lenses for lanterns consist of three types, *bull's eye*, fig. 956; *semaphore* (a mere modification of the Fresnel), figs. 954-5, and the *Fresnel* proper, figs. 957-8, the latter rarely used. Standard sizes for bull's eyes are  $2\frac{3}{4}$  in., 5 in., 6 in. and 8 in. The standards for semaphores are  $3\frac{1}{2}$  in.,  $3\frac{3}{4}$ , 4,  $4\frac{1}{4}$ ,  $4\frac{1}{2}$ , 5,  $5\frac{3}{8}$ , 6,  $6\frac{3}{8}$ , 7,  $7\frac{1}{2}$  and 8 in.
- Letter-board** (passenger car exteriors). 91, figs. 155-85. A horizontal board under the cornice, extending the whole length, on which the name of the company to which the car belongs is usually painted. The letter-board occupies the *frieze* of the car, and is often so called.
- Letter-box plate**. See below.
- Letter-drop** (postal cars). Fig. 1071. A plate with a spring flap for receiving letters for the post.
- Lettering** (of freight cars). A standard system of lettering and numbering cars, shown in figs. 658-663, was proposed to the M. C. B. Association, 1884, and submitted to letter ballot, but the following only was adopted, in reference to lettering and numbering *fast-freight line-cars*, viz.:
- "1st. The half of sides of car on which the doors do not slide to show the name of the fast-freight line (spelled out in full) and the car number (in the fast-freight line-series) immediately below it. In the same panel and within 2 ft. of the sill shall appear (in letters not over 4 in. high) the name of the railroad company

owning or contributing the car, and between the same and the sill shall appear the light weight of the car, with such other information as it is found advisable to give in connection with same.

"2d. The doors should have no marks whatever.

"3d. The ends to show the initials of the fast-freight line with the car number (in the fast-freight line series) and the light weight just below them; no other marks will appear on ends of car.

"4th. The half of sides of cars on which the doors do slide to be reserved for advertising symbols or trade-marks where used. The use of profuse lettering in this panel is to be discouraged, however, and it is recommended that only the simplest trade-marks or advertising signs should be used; the capacity of the car to appear near the sill in this same panel."

A resolution was adopted at the 16th Annual Convention, 1882, requesting all railroad companies whose initials are the same as those of other railroad companies to stencil the name of the road in full on some part of the car where it can readily be seen by freight agents.

**Lever.** "In mechanics, a bar of metal, wood, or other substance, turning on a support called a fulcrum."—*Webster*.

See <i>Brake-lever</i> .	<i>Hand-car lever</i> , or <i>propelling-lever</i> .
<i>Brake equalizing-lever</i> .	<i>Live lever</i> .
<i>Centre brake-lever</i> .	<i>Platform-lever</i> .
<i>Compression-lever</i> .	<i>Release-lever</i> .
<i>Cylinder-lever</i> .	<i>Roof-lever</i> .
<i>Dead-lever</i> .	<i>Thumb-lever</i> .
<i>Door-shaft lever</i> .	<i>Tripping-lever</i> .
<i>Eccentric-lever</i> .	<i>Uncoupling-lever</i> .
<i>Floating-lever</i> .	

**Lever-bracket** (Westinghouse freight brake-cylinder). 7, fig. 354.

**Lever-faucet.** Fig. 1592. A self-closing faucet shut by a spring and opened by the movement of a handle or lever. Also called *telegraph-faucet*. They are called *vertical* or *horizontal* according to the direction of the pipe or opening into which they are fastened.

**Lever-frame** (hand-car). 17, 18, figs. 1720-3. A wooden frame, shaped somewhat like a letter A, on top of a hand-car, which supports the lever-shaft and lever. In some modern cars, as 13, figs. 724-6, a gas-pipe S-frame is used for working double levers.

**Lever-frame cap** (hand-car). 18, figs. 1720-3. A short

horizontal piece of timber to which the lever journal-bearings are fastened.

**Lever-frame post** (hand-car). 17, figs. 1720-3. See also *Lever-post*.

**Lever-frame tie-rod** (hand-car). 25, figs. 1720, 1722. A vertical rod by which the *lever-frame cap* is bolted to the floor-frame.

**Lever-guard** (Janney coupler). 116, figs. 542-54. A guide on the platform-rail for the platform-lever.

**Lever-guide.** See above and *Brake-lever guide*.

**Lever hand-car.** Figs. 1709-26. The common style of hand-car, which see, worked by levers connected to cranks. These levers are usually placed horizontally, but sometimes they are vertical. *Double-lever* hand-cars, to avoid danger of trouble with the dead-centre, have recently been introduced. See *Hand-cars*.

**Lever-handle** (hand-car). 20, figs. 1720, 1723.

**Lever-jaw** (Janney platform). 33, figs. 542-554, 555-601. The cast-iron jaws upon which the *platform-lever* has its fulcrum.

**Lever jaw-pin** (Janney-Miller coupler). 97, figs. 542-554, 602-35. See above.

**Lever-post** (Kalamazoo lever hand-car). 1, figs. 1724-6.

**Lever-post base** (Kalamazoo lever hand-car). 31, figs. 1724-6. A large cast-iron washer.

**Lever-shaft** (hand-car). 21, figs. 1720, 1722. A short iron shaft to which the *propelling levers* are attached.

**Lever-shaft bearings** (hand-car). 22, figs. 1720-23.

**Lid.** See *Journal-box cover*. *Saloon seat-lid*.

**Lift.** A finger-hold attached to windows and window-blinds to take hold of in raising or lowering them. See *Sash-lift*. *Window-blind lift*.

**Lifting-plate** (Wolfrath combination sash-lift and lock). M, figs. 1700-2. An equivalent for the ordinary *sash-lift*.

**Lifting-spring** (Ormsby sash-balance). C, fig. 1703.

**Lift-latch**, or *sliding-door latch*. Figs. 990-1, 746-9. A lock, the latch of which is lifted by turning the knob instead of drawing it backward.

**Lift-latch lock.** "A lock in which the latch is pivoted and lifted free of the keeper, passing through a notch in the box instead of being simply retracted."—*Knight*. Similar to figs. 990-1, 746-9.

**Light.** "A window; a place that admits light to enter; a pane of glass."—*Webster*. See *End roof-light*. In



England among car-builders the windows are called lights. See *Door-light*. *Quarter-light*.

**Limit gauge.** Figs. 1325-6. A term applied to many forms of gauges which are used for determining whether pieces do not exceed or fall below a certain specified range of dimension. As used at the present time by the M. C. B. Association it is restricted to limit gauges for round iron, the standards for which, as fixed by that Association, are as follows :

*Sizes of Limit Gauges for Round Iron.*

Nominal diameter of iron.	Large size.	Small size.	Total variation.
Inches.	Inches.	Inches.	Inches.
$\frac{1}{8}$ .....	.2550	.2450	.010
$\frac{3}{16}$ .....	.3180	.3070	.011
$\frac{1}{4}$ .....	.3810	.3690	.012
$\frac{5}{16}$ .....	.4440	.4310	.013
$\frac{3}{8}$ .....	.5070	.4930	.014
$\frac{7}{16}$ .....	.5700	.5550	.015
$\frac{1}{2}$ .....	.6330	.6170	.016
$\frac{9}{16}$ .....	.7585	.7415	.017
$\frac{5}{8}$ .....	.8840	.8660	.018
1.....	1.0095	.9905	.019
$1\frac{1}{8}$ .....	1.1350	1.1150	.020
$1\frac{1}{4}$ .....	1.2605	1.2395	.021

**Lincrusta-Walton.** A decorative material for walls and ceilings, having something of the appearance and toughness of leather. It is made from the residuum of boiled linseed oil mixed with saw-dust. Designs of any form are pressed upon it and it is furnished in a great variety of colors. It is attached to walls generally with paste or glue, like wall paper, but is water-proof, and very flexible.

**Lindsay's steel-tired car-wheel.** A wheel invented by W. I. Lindsay, in which the *wheel-centre* is one single casting provided with two *grooves* into which corresponding *tongues* upon the flange fit. The tire is shrunk on and in addition bolted to the wheel-centre by eight bolts.

**Line car.** Figs. 3, 12, etc. A short term to designate cars belonging to the various *fast-freight lines* which run over several roads between the leading shipping points east and west. The number of these lines is large, and at the present time they are nearly all owned by associations of the roads themselves and not by private individuals. Their object is to make it possible to issue through bills of lading and to avoid breaking bulk, as well as to obtain greater dispatch.

At the 17th M. C. B. Convention, Chicago, 1883, the following resolutions were adopted:

"Whereas, It is a common practice to store line cars on side tracks during summer months or dull times away from home, after they have been in severe service; and,

"Whereas, Many of the cars after being so stored are found to be more or less out of proper condition, so that they need more or less repairs, and when put into service cause much detention to traffic and many trans-  
fers;

"Be it Resolved, therefore, That it is the sense of this meeting that all line cars owned by foreign companies should be returned to their owners instead of being stored on foreign tracks, and that a competent man should be detailed to inspect the stored cars and to arrange to have the necessary repairs made during the time such cars are out of service."

For standard lettering of line cars, figs. 658-9, see *Lettering*.

**Lining.** See *End-lining*. *Head-lining*. *Inside-lining*. *Feed-door lining*.

**Lining guards** (Gouge heater). Figs. 1424-5. Ribs fastened to the back of the fire-box inside to hold the brick lining in place.

**Lining-strips.** 54, figs. 84-5. Wooden or metal strips put on the inside of freight or baggage cars to protect the inside of the car from being injured by freight or baggage. Lining strips serve very much the same purpose as inside-lining.

**Link.** 1. "A short connecting piece, of circular or other equivalent shape; as one of the oval rings or divisions of a chain."—*Knicht*.

2. (Coupling-links.) Figs. 431-42. A short bar with an eye at each end for connecting two things together or for supporting one from another. When used alone the term in railroad service always means a *coupling-link*, which see. See also *Brake-block suspending-link*. *Eccentric-lever link*. *Hanger-link*.

3. ("American" bell-crank steam driver-brake). 20, figs. 333-5. Two short bars connecting the *piston* and the *bell-cranks*.

4. ("American" steam tender brake). 9, figs. 336-7. The bar connecting the *yoke* and *cylinder brake-lever* and serving as a fulcrum for the latter.

**Link-hanger.** A *swing-hanger*, which see, in the form of a link.

**Link-hanger eye-bolt.** Figs. 2112-3. A bolt passing through the transoms from which a very short *swing-hanger*, which see, is suspended.

**Link-p n** ("American" bell-crank steam driver-brake). 19, figs. 363-5. See *Link*.

2. Fig. 1776. A *coupling-pin*, which see.

**Linoleum.** A form of floor covering manufactured from linseed oil, prepared by a special process, mixed with ground cork and backed with canvas. Another floor covering of substantially the same nature as linoleum is known as *corticine*.

**Lintel.** 18, figs. 370, etc. The horizontal part of a door or window-frame above the sash. See *Deck-sash lintel*. 5, fig. 186.

**Lip.** See *Retaining-lip* (steel-tired wheels).

**Lip lamp-chimney.** Fig. 926-7. One with an indented ring near the bottom, for use with screw lamp-burners.

**Live-lever.** 6, figs. 333-9 and figs. 347-8. The one of a pair of brake-levers to which the brake-power is first applied is sometimes given this title, the other being termed the *dead-lever*.

**Lock.** Figs. 937-1037. "Anything that fastens—particularly an instrument having one or more bolts moved by a key, used for fastening doors, drawers, etc."—*Worcester*. Accordingly, in this dictionary bolts which have a beveled bolt, especially if they do not require a key to move them, are termed *latches*, and those with a square-ended bolt *locks*. See *Sash-lock* and *latch*. According to their purpose locks are divided into *berth-locks*, *door-locks*, *freight-car locks*, *grain-door locks*, *seat-locks*, *sliding-door* or *lift-latch locks*, etc. According to their manner of application, they are distinguished as *mortise locks*, inserted entirely within the door; *rabbeted locks*, visible on the exterior of the door, but boxed more or less into it; and *rim-locks*, entirely exterior to the door. A *dead-lock* is one which has no springs within it but is moved entirely by key; in distinction from a *spring door-lock* or *night-latch*, which is moved by a key from without, but has a beveled bolt so that it snaps shut automatically. A *padlock* is one used with a staple and hasp, and which is not otherwise permanently attached to the opening which it fastens. The *Yale lock*, which see, is a special form largely used. Freight-car locks are

usually *seal locks*. See *Car seal*. See also *Private lock* (English).

**Lock-bolt** (seal-lock). E, fig. 1011. The bolt which enters the shackle and effects the locking.

**Lock-case.** Figs. 1029-1037. The outside or covering part of a lock, more especially a padlock.

**Lock-chain.** 76, fig. 86. A chain by which a padlock is fastened to a car.

**Locker.** A small compartment or closet for storage. A *closet* is usually the same height as the room and a *locker* is of less height. Lockers are frequently attached under cars, as in figs. 50, 56.

**Lock-keeper.** Figs. 1021, etc. The box on a door-jamb into which the bolt of a lock protrudes when shot. See *Keeper*.

**Lock-nut** ("American" bell-crank driver-brake). 24, figs. 333-5. (Kirby's car-door lock.) C, figs. 1003-4. The outer one of a pair of nuts on one bolt, which by screwing up separately to a tight bearing locks the inner one.

**Lock-seal.** Figs. 1108-19, etc. A piece of glass, lead or paper, which forms a seal for a lock, so that the latter cannot be opened without its being known. See *Car-seal*.

**Lodging-car.** A passenger or box car fitted up with sleeping accommodations for men at work on the line of a road. More commonly called *boarding-car*.

**Logging-cars.** Figs. 1727, etc. A special variety of light and strong cars used for getting out lumber, running usually on cheap *logging railroads*, of which a great number now exist.

**Long brake-rod** (Stevens brake). 12, fig. 232. A rod which connects two levers, one on each truck, together.

**Long brake-shaft.** 94, figs. 82, 104. One which extends up above the top of a car so that brakes can be applied by a person on the roof.

**Long gondola car.** Figs. 31-32. See *Gondola car*.

**Longitudinal-seat** (street and suburban cars). 34, figs. 1843-4. A seat which extends lengthwise of a car.

**Longitudinal-step.** Figs. 1839-1841. A board which extends along the side of an open car, or a car with doors on the side, used as a step in getting on or off the car or for passing from one end of the car to the other.

2. (English.) See *Foot-board*.

**Longitudinal-step bracket.** Figs. 1839, 1841.



**Longitudinal tie-rod** (English). 9, figs. 117 and 206. Corresponds in part to an American *truss-rod*. A long bolt binding the timbers of the *underframe* together longitudinally. It is generally horizontal, and if inclined slopes downward to the ends of the vehicle to prevent them sagging or drooping. In English eight-wheeled vehicles *truss-rods* are used, but in four-wheeled vehicles the ends sag instead of the centre.

**Long seat-end**. 3, fig. 1122. A vertical frame of wood or (usually) iron which combines a *seat-end* and *seat-stand* together, supports the end of the car-seat and also for the arm or seat-end. A *short seat-end* is a seat-end proper, which is supported on a separate stand.

**Long smoke-pipe** (Gouge heater). 11, figs. 1405-7; 58, figs. 1413-4. The pipe through which the draft of the stove normally passes after the fire is well started. The *short smoke-pipe* gives a direct draft.

**Long T-bolt** (Janney coupler). 13, figs. 542-554, 555-601. A bolt by which the *combination-yoke* acts against the *centre buffer-spring*.

**Lookout** (freight caboose). Figs. 44-7, 102-4. A small cupola or upper deck in the roof to afford opportunity for the display of signal lights and to enable train hands to keep a better lookout on the train. They are in increasing use, but the majority of caboose cars as yet do not have them.

**Loose berth-hinge**. Fig. 1237. A berth-hinge the two parts of which are detachable. It enters into a *loose berth-hinge bushing*, fig. 1238. See *Berth-hinge*.

**Loose-globe**. Fig. 868. See *Lamp-globe*.

**Loose-globe lamp**. Fig. 868. A lamp or lantern in which the globe is attached to the frame by springs, screws or catches, so that it can be easily removed.

**Loose-joint butt-hinge**. Figs. 779-90. A *butt-hinge*, which see, permitting the door to be lifted off its hinges when desired.

**Loose-pin butt-hinge**. Fig. 782. A *butt-hinge*, which see, having a removable *hinge-pin*.

**Loose-wheel**. A term applied to various devices for enabling car-wheels to revolve independently of each other. A great variety of patents for this purpose have been taken out but none of them have been successfully introduced, and experiment seems to indicate that the advantages are more theoretical than practical, and are greatly exaggerated theoretically. See especially a series

of tests by Reuben Wells in the transactions of the Master Car-Builders' Association, 1870.

**Lorenz refrigerator car**. Figs. 130-1304. A car which uses salt and ice for refrigerating, and carries the ice in *ice-racks* at the end of the car.

The walls are generally about six inches thick, composed, including bottom, of: (1), the outside siding; (2), *air-space D*; (3), a non-conducting composition sheeting; (4), intermediate lining; (5), non-conducting *cork wall*; (6), inside lining. All the air spaces, except those in bottom, are in free communication with each other. *Air-inlets E*, in end of car, permit free circulation of air in and out of air-jacket; and *floor air-inlets F* perform the same office for air spaces in the bottom. The doors are constructed like the walls.

The floor slopes to centre and is provided with a narrow *trough K*, covered by a *cover-strip L* and provided with *floor-traps N*. *Draining-notches O* permit access of water to the trough. It is of galvanized iron and contains a retaining trap in the centre of its length. A bottom *flushing T* of galvanized iron runs around entire base of walls to prevent access of moisture to the framing.

Fresh air from the atmosphere enters the *air-inlet pipes U*, built into the non-conducting space, where it becomes cooled, sinks and enters car near the bottom through the *inside inlet-strainer W*, the moisture which it has parted with finding its way to the central *trough K*. Foul air, inside the car, enters the *outlet pipes H* through the *internal air-holes J*, and becoming condensed, sinks and discharges into the *air-space D*, next inside the outer siding, where it is utilized in cooling the air-jacket. Moisture condensed inside the car drains to the central trough, where the trap expels it.

**Lorry, or larry**. Figs. 1713, 1730. *Push cars* used in construction for moving rails, ties, etc. Often made with only a half bearing for the journals so that the frame can be removed from the wheels at any time. See note to *Laurie car*.

**Loughridge air-brake**. A system of continuous brakes, invented by Wm. Loughridge and in use on the Baltimore & Ohio Railroad and others, which is operated by compressed air. The air is compressed by an air-pump worked by an eccentric on one of the axles of the engine, and is stored up in a tank on the engine or tender. When

the brakes are applied the compressed air is conveyed from the tank by pipes connected together between the cars by flexible hose to cylinders with pistons under each car, by means of which the pressure of the air is communicated to the brake-levers and thence to the brake-shoes.

**Lower arch-bar.** The *inverted arch-bar*. See *Arch-bar*.

**Lower bell-crank bracket** (American automatic compression brake, which see). 12, figs. 368-9.

**Lower-berth** (sleeping cars). 1, figs. 676-8. The bed nearest the floor made up by dropping down the seats and seat-backs. The mattress for it is carried by day in the pocket formed by the upper berth. In the Mann boudoir cars, figs. 680-1, the lower-berth intact forms a sofa by day, the sofa-back forming the upper berth. See *Berth*.

**Lower berth-curtains** (Mann boudoir cars). 13, figs. 680-1. See *Berth-curtain*.

**Lower brake-rod.** 97, figs. 1907-69; 5, figs. 227-35; 10, figs. 324-5. A rod which connects the two brake-beams or levers of *outer-hung* brakes. When one brake-lever only is used on each truck the rod is attached at one end to the lever and at the other end to the opposite brake-beam. When two levers are used the rod is attached to each lever. It is supported in case of accident by a *lower brake-rod carrier*. See note to fig. 1967. With *inner-hung* brakes the substitute for the lower brake-rod becomes a part in compression and is called the *brake-lever coupling-bar*, 19, figs. 249-51.

**Lower brake-shaft bearing.** 97, figs. 87-95; 155, figs. 155-7. An eye or support for a vertical brake-shaft, near the lower end. The support at the lower end is called the *brake-shaft step*. The lower bearing is above the step.

**Lower-cap** (triple valve for Westinghouse brake). 3, figs. 332-3. (Of reducing-valve, West. train signal app's.) 4, fig. 691. (Of Westinghouse engineer's brake-valve.) 11, fig. 334.

**Lower-chord** (of a truss). 14, figs. 2182-6. The lower outside member.

(The distinction between a lower chord and a truss-rod, in trusses like that represented in figs. 2181, 2193, is not very clear; but a *chord* is usually so called only in a truss having both vertical and inclined members. A mere *trussed beam* is not a truss in modern technical usage.)

**Lower cone** (graduated bolster-spring). 2, fig. 2096. See *Spiral spring*.

**Lower connecting-rod stirrup** (American automatic compression brake, which see). 24, figs. 368-9.

**Lower corner-plate.** 57, figs. 82, 86; 26, figs. 109-12. See *Corner-plate*. A *push-block*, which see, is usually cast on this corner-plate.

**Lower or bottom cylinder-head** (Westinghouse driving-wheel brake-cylinder). 4, figs. 314-5.

**Lower-deck.** 171, figs. 159-60. The main roof of a passenger car on each side of the *clear-story* or *upper-deck*.

**Lower deflector-frame** (Gouge heater). Fig. 1457. A frame inside of the front of case to which the deflector is attached, through which hot air is discharged near the stove.

**Lower discharge-valve** (air-pump for Westinghouse brake). 32, figs. 298-9. A *puppet-valve*, which see, at the bottom of the air-pump through which the air below the piston escapes.

**Lower door-hinge** (English). 180, fig. 205. See *Door-hinge*. This hinge is made with a longer butt than the others, to allow for the curvature or *fall-under* of the door.

**Lower door-panel.** 10, fig. 370.

**Lower door-sash.** 13, fig. 370. The lower section of a door-sash, which is made in two parts. This is commonly movable, the other fixed.

**Lower end-panel** (street cars). 30, fig. 1845.

**Lower foot-board** (English). 171, figs. 205, 207. American equivalent, *platform-step*. A board running nearly the whole length of the carriage, and situated about 20 in. from the ground.

**Lower outside-panel** (street cars). 28, figs. 1843-4. It is usually made concave.

**Lower seat-back rail** (street cars). 40, figs. 1843-4. See *Upper seat-back rail*.

**Lower side-bearing** (logging cars). Figs. 1737, 1762. The *truck side-bearing*.

**Lower steam-valve** (for engine of Westinghouse brake). 7, figs. 298-9. See *Main steam-valve*.

**Lower swing-hanger pivot.** 48, figs. 1912, 1917-8, 1959. A bar by which a *spring-plank* is attached to the lower end of a *swing-hanger*, which see.

**Lower valve-chamber cap** (Westinghouse air-pump, etc.). 34, fig. 298.

**Lower wainscot end-rail.** 30, fig. 186. See below.

**Lower wainscot-rail** (passenger car interiors). 74, figs.



- 175-3 ; 2, figs. 679-95. A longitudinal rail immediately above the truss-plank. The *upper* wainscot-rail comes directly below the window.
- Lower window-blind.** 140, figs. 155-85 ; 18, figs. 692-3. The lower section of a window-blind which is made in two parts, as is usually the case.
- Lower window-blind lift.** Fig. 1673 ; 23, figs. 692-3. The lifts for lower blinds differ from those for a single blind in having a lug which engages with the upper blind when the lower one is raised up half-way, and thus the upper one is raised with the lower one. See *Window-blind lift*.
- Low-sided wagon (English).** A freight car with sides and ends about 9 in. high. It has generally no doors and is used chiefly for conveying pig-iron and similar loads. See *High-sided wagon*. *Medium-sided wagon*.
- Low truck.** Trucks constructed so as to bring the floor nearer to the rails; mainly used in construction service. They are commonly constructed so as to bring the floor about 3 ft. 2 to 6 in. from the rail instead of about 4 ft.
- Lubricator.** Figs. 360-2, etc. An instrument used for applying a lubricant. Also called *oiler*. See *Automatic lubricator*.
- Lug.** A projecting stud or ear to afford a bearing or point of attachment. See *Follower-plate lug*, fig. 1742.
1. (Anderson sash-balance.) 1, fig. 1707.
  2. (Atwood's hemp-packed wheel.) Fig. 2166. Projecting cross-bars on the outside of the wheel-centre to give bond to the hemp packing.
  3. (Bo'ster-springs.) 5, figs. 2395-6. Projecting points upon the *spring-plates* to enter the timber.
  4. Or *standards* (freight-car seal-lock). N, fig. 1011. The projections carrying the pivot of the clasp by which the lock is fastened.
  5. (Van Lieuw grain-door.) 1, fig. 378.
  6. (Head-board.) Fig. 1279 $\frac{1}{2}$ .
- Lug-bolt.** Fig. 1869. A *strap-bolt*, which see, with a lug turned up at one end to enter a mortise in the timber and in part relieve the attaching bolts from strain.
- Lumber.** Timber of all kinds sawed into merchantable form, but more particularly such as is not sawed into boards. The term, however, is often used in the broad sense.
- Lumber-car.** 1. A car of extra length, usually of 34 ft.;

more particularly intended for carrying lumber ; generally but not always a box car.

2. A *logging-car*, figs. 1727-30, etc., is sometimes called a lumber-car.

**Lumber lorry.** Fig. 1730. See *Lorry car*.

**L-window-button.** More commonly, *monkey-tail*. Fig. 1653. A catch shaped somewhat like a letter L, so as to fall by gravity into the desired position, attached to a sash to engage with a *monkey-tail stop*, fig. 1662, fastened to the casing.

## M

**McKay's curtain brackets.** Figs. 1684-5 and 1687. A form of bracket for holding the various forms of spring roller curtains, one bracket having a rectangular hole and the other a circular. A variety of patterns are made besides those shown. The McKay and Hartshorn *shade roller* accomplish the same end in much the same way, but the McKay works with a cam, while the Hartshorn works with a pawl. See *Shade-roller*.

**Machine-bolt.** Figs. 1865-6. A bolt with a metal thread cut on it, and with a square or hexagonal head, especially if turned or finished. The word *bolt*, unqualified, usually means a machine-bolt.

**Magazine (base burning stoves).** Fig. 1472. A general term for a receptacle for coal before it reaches the fire-pot proper, usually situated directly above the latter. The term is sometimes also applied to the fire-pot, figs. 1330 to 1537, but incorrectly.

**Magazine-door, inside and outside** (Johnson heater). 10-11, fig. 1472.

**Magnetic curtain holder.** A device for holding a window-shade fixed in any position, while still leaving it easily movable. It consists simply of a bar magnet running across the lower edge of the shade, bearing against two fixed bars of soft iron, one on each side of the window, to which the magnets attach themselves. To move the curtain it is detached from contact with the iron bars, and then the spring rollers roll it up. On being released, the magnets attach themselves again to the bar. Invented by Mr. Wenton, of Wellesley Hills, Mass. No illustration.

**Mail-car.** Figs. 57, 66-9. A car for carrying mails. More commonly, *postal car*. Mail-cars are sometimes defined

as those used only for carrying mail-bags and not for distributing mail-matter, but the distinction is not always observed. Distributing mail-cars are, however, always called *postal cars*, which see. See also *Combination baggage car*.

**Mail-car lamp.** Figs. 856, etc. See *Postal-car lamp*.

**Mail-catcher.** Figs. 57, 1086. A contrivance consisting of a bent iron bar, attached to the door of a postal car for taking up or "catching" mail bags while the train is in motion. The English system of collecting mail-bags is different from the American, and relies upon the use of nets. The leather bag is fastened by a spring to an iron bar in the car and when the exchanging station is near the bar is turned out, the bag hanging suspended. At the same time, the catching apparatus, consisting of a net attached to a bar, is put out. The bag from the car is caught in a net attached to a stationary post and the bag for the car caught in the car net in a similar manner. The American plan has been copied in Australia and India.

**Mail van (English).** A vehicle adapted to run on passenger trains and fitted with apparatus for sorting and conveying letters, and generally with apparatus for taking up and dropping mail-bags while the train is at full speed. A mail van in which letters can be posted and letters are postmarked is termed a *traveling post-office*. When fitted only for conveying mail-bags and not for sorting, it is termed *mail-van tender*. Every projecting piece of either wood or metal is carefully padded to prevent injury to the post office officials in collisions, etc.

**Main-bottom (Johnson heater).** 21, fig. 1472.

**Main-cap of triple valve (Westinghouse brake).** 3, figs. 332-3. A screw-plug in the lower end of the chamber which contains the triple-valve piston.

**Main-carline (freight cars).** 82, figs. 89-96. A carline stronger than the ordinary carlines, so as to support the roof and tie the two *plates* together.

**Main-cock (for low pressure gas, Pintsch gas-lighting apparatus).** Figs. 820-1. A cock usually placed in the saloon for the control of the low-pressure supply. It regulates all the burners at once, in addition to which there are separate cocks to each.

**Main draft-spring (Janney).** 28, figs. 542-554, 555-601. So called in distinction from the *auxiliary draft-spring*

27 behind it. The *centre buffer-spring* lies above both. **Main-pipe (Westinghouse brake).** Fig. 326. The *brake-pipe*.

**Main-rafter.** A *main-carline*, which see.

**Main-reservoir (Westinghouse brake).** 1, figs. 297-9, 294-300. A cylindrical boiler-plate tank, carried on the locomotive, under the foot-board, to hold a supply of compressed air. So called in distinction from the *auxiliary reservoirs* under each car.

**Main-sheave (pile-driver car).** 10, figs. 1821-4. The sheave at the top of the leaders over which the *hoisting-rope* passes.

**Main steam-valves (Westinghouse brake-pump).** 7, fig. 298; 14, fig. 299. Two piston valves admitting and exhausting steam above and below the main piston. The upper is of larger diameter than the lower, both being rigidly connected by a rod, so that the pressure of steam (always between them) keeps them in the highest position, admitting steam above the main piston and exhausting from beneath it. At the end of the stroke they are moved downward by steam being admitted above the *reversing piston* by the *reversing valve*, which see. They are usually called simply *main-valves*.

**Main-top (Johnson heater).** 23, fig. 1472.

**Main-valve, upper and lower (Westinghouse air-pump, etc.).** 7, fig. 298, and 14, fig. 299. The *main steam-valves*, which see.

**Male centre-plate.** The body and truck centre-plates are sometimes called male and female. See *Centre-plate*.

**Malleable iron.** Castings whose brittleness has been removed by packing them in powdered hematite (peroxide of iron) in tight fire-brick cases and subjecting them to a continued red heat for about a week. They are then allowed to cool slowly. The oxygen of the hematite combines with and removes a part of the carbon of the iron, making the castings almost as tough as wrought iron, but they are ordinarily not truly malleable, or capable of being rolled or forged. Malleable iron is much used for pipe fittings and similar small castings, and even for brake-shoes.

**Mammoth lamp-chimney.** Fig. 929. See *Lamp-chimney*.

**Mandrel.** 1. (For lathes.) A shaft serving as a temporary axis for objects to be turned.

2. (Foundry.) A plug around which a body of metal is cast.



**Mandrel-pin, or cross-bar** (swing link-hanger). 4, figs. 2110-1. The bar which supports the spring-plank. See *Swing-hanger*.

**Man-hole**. 110, figs. 139, 142. An opening in a boiler or tank through which a man can creep to the inside. The tanks for tank-cars always have man-holes on top.

**Man-hole cover**. 111, figs. 139-42. A plate or lid to close a man-hole.

**Man-hole cover chain**. A chain with which a man-hole cover is fastened to a tank to prevent it from falling off the tank when the man-hole is opened.

**Man-hole hinge**. 113, figs. 139-40. A hinge by which a man-hole cover is attached to a man-hole ring.

**Man-hole ring**. 112, figs. 139-42. A metal ring riveted around a man-hole, and which forms a seat for the cover.

**Mann "boudoir" sleeping cars**. Figs. 50, 212-13, 680-1. A style of sleeper the distinguishing feature of which is the subdivision of the car into small state-rooms or "boudoirs" running transversely of the car, and all opening into a common *corridor* at one side of the car. These cars were for a time the only sleeping cars in Europe, and have been only recently introduced into this country, the first cars having been run between Boston and New York.

**Mansfield deck-sash opener**. Figs. 1625-6. One of the numerous styles of deck-sash openers, the peculiarity in which consists in the manner of connecting each end of each deck-sash to an opener in such manner that either the front end or the back end of the window may be thrown open, producing draft either into or out of the car at discretion.

**Mansell retaining ring**. Figs. 2151, 2156-58. A mode of connecting steel tires to the wheel-centres by a ring of an approximate L or U cross-section, which secures the tire to the wheel, so that every part of the tire is securely held, into however many pieces it may be ruptured. This ring is almost universally used in English passenger service, and no tire so secured has ever been known to leave the wheel. Various applications of the ring are shown in figs. 2162-65 and 2177-78.

**Mansell wheel** (English). Figs. 2151 and 2158. A railroad wheel in which the hub is composed of two wrought or cast-iron rings bolted together, and gripping the ends of contiguous tapered teak blocks which serve as spokes, and are secured to the tire by two

rings fitting into grooves in the tire, and bolted to the teak blocks. This wheel is almost universally used in English passenger service.

**Marden's brake-beam**. Figs. 255-6. A brake-beam, brake-head and clamp, patented by A. H. Marden, of Charlestown, Mass. The beam is a steel deck-beam. The malleable iron head is adapted to several forms of shoes, and is fastened to the beam by a slot in the lower edge of the T flange. The head is cored out, and when in position over the slot in the beam a wrought-iron key is driven in, which lifts the head into the slot and so secures it. The key is made tapering at one end, with a half head at the other end. The malleable-iron brake-lever fulcrum fits the T flange of the beam and is kept in place by a bolt. The brake-beam, with its attachments complete, weighs 96 pounds.

**Marking** (cars). See *Lettering*.

**"Marlborough" basket-rack**. Fig. 698. See *Basket-rack*.

**Marshaling** (English). American equivalent, *switching* or *drilling*. Arranging the cars of a freight train in proper station order.

**Mason's rocker car-seat**. Figs. 1123-28. A seat having rockers resting on a concave support by which the seat-back is enabled to force the outer edge forward and upward so as to give the seat proper a more comfortable inclination. It is the standard of the Pennsylvania Railroad and several other lines. The *adjustable roller car-seat* and several others seek to accomplish the same end. See *Car-seat*.

**Mast**. 1. (Of a derrick or crane.) 15, figs. 77-78: A, fig. 145; D, figs. 151-3. The main upright member against which the boom abuts.

2. (Of brake-gear.) A *brake-shaft*, which see.

**Master Car-Builders' standards**. A variety of standard details for cars, or recommendations in respect to them, have been promulgated by the Master Car-Builders' Association, and are separately described in this volume. See

*Axle*. Figs. 1974-5.

*Bolts and nuts*, dimensions for. Figs. 1834.

*Boring wheels*. (That six dogs be used.)

*Brake ratchet-wheel*.

*Brake-shaft*.

*Brake-step*.

*Check-chains*.

*Chill-mould*.

**Dead-blocks.** Fig. 405-7.

**Dictionary** (back of title-page).

**Distance-gauges between flanges.** Fig. 1996.

**Drawbar attachments and dimensions.** Figs. 401-4.

**Draw-springs, capacity of.**

**Height of drawbars.** Fig. 408.

**Interchange of cars, rules for.** (These latter not prepared by the Car-Builders' Association acting as such.)

**Journal-bearing and journal-bearing key.** Figs. 1982-92.

**Journal-box.** Figs. 1997-2001.

**Ladder and grab-iron attachments.** Figs. 656-7.

**Limit-gauges (for round iron).** Figs. 1825-6, 1829.

**Line cars, storage of.**

**Lettering for line cars.** Figs. 658-9.

**Pedestal.** Figs. 2021-4.

**Running boards.** Figs. 656-7. (The size of iron specified should read  $1\frac{1}{4}$  by  $\frac{1}{2}$  in., not 2 by  $1\frac{1}{4}$  in.)

**Screw-threads.** Fig. 1834.

**Wheel and axle-gauges, consisting of the following:**

**Centering-gauge.** Fig. 2114.

**Circumference-measure.** Figs. 2119-20.

**Diameter testing-gauge.** Fig. 2122.

**Flange and journal gauge.** Fig. 2123.

**Flange distance (inside to inside) gauge.** Fig. 1996.

**Guard-rail gauge.** Fig. 2117.

**Journal distance-gauge.** Fig. 2118.

**Journal length and diameter gauge.** Fig. 2116.

**Journal shoulder-gauge.** Fig. 2115.

**Wheel-bore testing-gauge.** Fig. 2121.

**Wheel-tread.**

**Master-key.** "A key which commands many locks of a certain set, the keys of which are not interchangeable among themselves. While neither one of a series of keys may suffice to open any lock, besides the one for which it is constructed, a master-key is one which may operate any one of the set."—*Knight*.

**Mast-pocket** (wrecking car). 20, figs. 77-8. A heavy casting under the car supported by a *derrick truss-rod* serving as a socket for supporting the mast of a derrick to hold it upright. Another method of supporting the mast is by a large *base-plate* (D, figs. 151-3) bolted to the floor of the car.

**Mast-sheave** (of a derrick or crane). E, figs. 151-3. A sheave or pulley-wheel placed at the top of the mast.

**Mat.** Figs. 806-7. See *Floor-mat*.

**Match-lighter.** Figs. 1038-9. A *match-striker*, which see.

**Match-striker.** Fig. 1038. A metal plate with a rough surface.

**Match-striker frame.** Fig. 1039. A metal frame for holding a piece of sand-paper.

**Matting.** See *Cocoa matting*.

**Mattress** (Mann boudoir cars). D, E, figs. 680-1. In ordinary sleeping cars both mattresses are stowed away by day above the upper berth. In the boudoir cars they go in boxes under the seats.

**Mattress-box** (Mann boudoir cars). J, figs. 680-1. See above.

**Meat timbers** (refrigerator car). The vertical and horizontal timbers inside the refrigerating chamber on which the meat is suspended. They are usually independent of the framework of the car and fastened to it with coach screws.

**Medium-sided wagon** (English). Figs. 116-19. American equivalent, *four-wheeled gondola car*. A vehicle for freight service, with sides and ends about 30 inches high, and no roof. The doors are generally arranged as shown, but often extend the whole depth, and sometimes the whole length and depth of the side. About half of all the freight cars in England are of this variety, a *tarpaulin*, which see, being used to protect the freight from the weather. See *Low-sided wagon*, *High-sided wagon*.

**Melon-shaped lamp-globe.** Fig. 950. See *Lamp-globe*.

**Metal screw-thread.** A form of screw-thread used when both the male and female screws are made of metal. Metal threads are made of the same size as the spaces between them, whereas the spaces between wood screw-threads are made wider than the projections. Metal threads are shown in figs. 1865-7, 1827-33. See also *Sellers system of screw-threads*.

**Metal-seal.** Figs. 1108-19. See *Car-seal*.

**Micrometer gauge.** A general term for any form of gauge giving very minute and exact measurements. There are several varieties; the most common is one with an accurate screw-thread and an index to give the number of revolutions and fractions thereof.

**Middle corner-plate.** 56, figs. 82-86. See *Corner-plate*.

**Middle door-panel.** 11, fig. 370. See *Door-panel*.

**Middle door-rail.** 148, figs. 158-85; 6, fig. 370. A horizontal bar intermediate between the top and bottom rails. See *Door-frame*.

**Middle longitudinal** (English). 5, figs. 116-119 and 206. American equivalent, *intermediate sill*. A part of the *underframing* supporting the body or floor, and in many cases transmitting the huffing and the draft strains.

**Middle of axle.** A, figs. 1974-5. The portion of a car-axle



between the two sloping *necks* which come next to the *wheel-scat*. See *Axle*. *Car-axle*.

**Middle safety-beam** (six-wheel trucks). 52, fig. 1969. A beam attached to the two transoms to hold the centre axle in case of breakage.

**Middle-transoms** (six-wheel trucks). 21, fig. 1969. The two cross-pieces nearest the centre in distinction from the two outside transoms. They are sometimes made of iron to allow the two swinging *spring-beams* to be connected to each other by the *bolster-bridge*.

**Milk-car**. Fig. 10. A car for carrying milk in cans, usually built with platforms similar to baggage cars, and provided with the same kind of springs as passenger cars.

**Miller coupler-buffer and platform**. Figs. 636-43. An arrangement for coupling cars automatically. It operates in coupling by the beveled faces of the *hooks* pushing each other to one side, compressing the centre buffers at the same time, until they snap past and engage with each other, in which position they are held by a *leaf-spring* or *coupling-spring*, sometimes also called *side-spring*. On sharp curves the hooks sometimes disengage with each other, and the fact that this is impossible with the Janney couplers (which see) is one of the advantages claimed for it. The Miller coupler may be said to be in universal use on American passenger cars, except on the increasing number of lines which use the Janney. The patents on the device have expired. A *Janney-Miller coupler*, which see, has recently been introduced by the manufacturers of the Janney coupler, in order to enable the latter to be used with rolling stock equipped with the Miller. The platform is arranged so that the line of draft and the compressive strains on the car are in a direct line with the sills. The Miller draw gear is sometimes used on freight cars, as in figs. 121-5, but only for those intended to be run in passenger trains or at passenger speeds.

**Miller buffer** (Janney-Miller coupler, which see). 42, figs. 554, 555-601.

**Miller buffer-guide** (Janney-Miller coupler). 29, figs. 554, 555-601.

**Miller buffer-yoke** (Janney-Miller coupler). 44, figs. 554, 555-601.

**Miller combination hook** (Janney-Miller coupler). 41,

figs. 555-601. The hook used to convert the Janney coupler to the Miller.

**Miller stop** (Janney-Miller coupler). 43, figs. 554, 555-601.

**Miller stop-bolt** (Janney-Miller coupler). 56, figs. 554, 602-85.

**Mine-car**. Fig. 26. A small car for carrying minerals in mines, usually four-wheeled.

**Mineral wool**. A substance having much the appearance which its name implies, manufactured from the slag of iron furnaces by throwing against it while in the molten state a strong blast of air. It is used for *deadening* in passenger cars and also largely as a non-conductor for coating steam-pipes and boilers.

**Minot heating burner**. Fig. 902. See *Heating-burner*.

**Mirror** (for wash-rooms of sleeping cars). Fig. 1570. A looking glass.

**Mirror-frame spring**. Fig. 1257. A *Mirror-sash holder*.

**Mirror-guard** (wash-rooms, etc., of sleeping cars). Figs. 1531-7. A fender of various forms to protect mirrors. Usually nickel-plated bars across the face, fig. 1587, and a tray for towels or brush and comb at the bottom of the mirror.

**Mirror-panel** (Mann boudoir cars). 3, figs. 680-1. A panel above the central window of four-place boudoirs, filled by a mirror.

**Mirror-sash**. Fig. 1256. A frame of a mirror which covers a *lamp alcove* in the side of a car. It slides up and down like a window-sash.

**Mirror-sash holder**. Fig. 1257.

**Miscellaneous furnishings**. Figs. 1038-1049.

**Miscellaneous heaters**. Figs. 1473-9.

**Miscellaneous types freight-car trucks**. Figs. 1941-53. All these designs are practically obsolete. See *Diamond truck*.

**Mitchell automatic freight-car coupler**. Fig. 415. One of those recommended by the M. C. B. Association for further trial. It has no loose link. See *Automatic freight-car couplers*.

**Moehring argand burner**. Fig. 872. See *Argand burner*.

**Molding**. Figs. 1050-64. See *Moulding*.

**"Monarch" burner**. Fig. 879. A double-spring burner.

**Monitor deck-sash pivot and ratchet catch**. Figs. 1622-3. A device for regulating the opening of deck-sashes by means of a small fixed *ratchet-plate* in which a

*ratchet-bolt* engages, holding the sash fixed in any one of four different positions. See *Deck-sash pivot*.

**Monitor-top.** A *clear-story*, or *upper deck*, which see.

**Monkey-tail** (window-button). Fig. 1653. Also called *L window-button*, which see. Little used.

**Monkey-tail stop.** Fig. 1662. A form of *sash-stop* for monkey-tail window-buttons.

**Morgan's automatic deck-sash pivot.** Figs. 1618-21. A device for regulating the openings of deck-sashes, the essential feature of which is the use of a double circular undulating ratchet, one attached to the sash and the other to a fixed part of the car, the two ratchets being pressed together by springs so as to admit of easy motion of the sash by hand at the same time that it is held in any position when released.

**Mortise-lock.** Fig. 993. "A lock adapted to be inserted into a mortise in the edge of a door, so as only to expose the selvage or edge-plate."—*Knight*. See *Lock*.

**Mould.** See *Chill-mould*.

**Moulding.** 1 to 15, figs. 1050-64, and many other engravings throughout the volume. "A mode of ornamentation by grooved or swelling bands or forms, following the line of the object."—*Knight*. Small mouldings are often termed *beads*, and also *fillets*. A *cove* moulding is one of concave section. There are a great variety of other special technical terms for different forms of mouldings. Mouldings are either straight or *waved*, which see.

See also *Deck eaves-moulding*. *Window cove-moulding*.  
*Eaves-moulding*. *Window-moulding*.  
*Platform-hood moulding*. *Window-sill moulding*.

2. (For car-seats). Figs. 1199-1204. Also called *Seat-back bands* or *seat-moulding*. A metal band to finish the edge of the seat-back. Plush or leather-covered strips are also used.

**Moulding-joint cover.** Fig. 1697; 9, figs. 692-3. A piece of wood or metal in some ornamental form for covering the joints of two pieces of moulding. See *Window-moulding joint cover*.

**Mouth-piece** (Gouge heater). Fig. 1453. The part to which the feed-door is connected.

**Movable foot-rest** (car-seats). 8, fig. 1120. More properly, simply *foot-rest*, which see; in distinction from fixed *foot-rails* under the seats.

**Movable grate** (Gouge heater). 1, fig. 1407. The circular central grate inside the *fixed grate*.

**Muck-bar.** "Bar iron which has passed once through the rolls. It is usually cut into lengths, piled, and rerolled."

—*Knight*. Certain grades of iron axles are made directly from muck-bars and contain no scrap. See *Axle*.

**Muffler** (Eames vacuum brake). A device to render noiseless the emission of steam at the ejector when brakes are applied. It is simply a lot of beads or shot, through the interstices of which the steam forces its way.

**Muley-axle.** Fig. 1976. An axle without collars. Little used.

**Mullion.** A slender bar between panes of glass or panel work. See *Door-mullion*, 2, fig. 370; *Window-blind mullion*, 15, figs. 692-3; *Window-mullion*, 146', fig. 158.

**Muntin.** A corruption of the word *mullion*, chiefly used in England. See *End-stanchion* or *muntin*.

## IN

**Nail.** "A small pointed piece of metal, usually with a head, to be driven into a board or other piece of timber, and serving to fasten it to other timber."—*Webster*.

The common nails of commerce are divided into *cut* nails and *clinch* nails, which see. They are distinguished in size by the number of pennies, as 10d., 20d., etc., nails. Other varieties, which see, are eyelet-nails, fig. 805; head-lining nails, fig. 1045; solid-leather nails, figs. 1045½, 1230. See also *Panel-pin* (English).

**Name-panel.** 72, figs. 169-81. A panel, usually of elliptical form, on the outside of a passenger-car body below the windows, on which the name or number of the car is painted. They are not now usual.

**Name-plate** (Cowell coupler). 12, fig. 538. (Gouge heater.) 88, fig. 1412. See *Door name-plate*.

**Narrow gauge.** The distance in the clear between the heads of the rails of a railroad when less than 4 ft. 8½ in. See *Gauge*. What may be called the standard narrow gauge is 3 ft. In India and elsewhere the *meter* gauge, 3 ft. 3⅝ in. is the standard narrow gauge. Less frequently 3 ft. 6 in. is used, as sometimes 4 ft., etc. The narrow gauge at the present time seems to be passing out of use, its assumed advantages not being founded on fact.

**Narrow-tread wheel.** A wheel with the ordinary width



of tread, which is usually about 5 in. See *Wheel. Car-wheel.*

**Neck door-bolt.** Fig. 759. See *Door-bolt.*

**Neck of axle.** B, figs. 1974-5. The sloping portion of a car-axle just inside of the hub of the wheel.

**Needle-beam** "(Civil engineering.) A transverse floor-beam of a bridge, resting on the chord or girders, according to the construction of the bridge."—*Knight*. The term seems, however, to be more particularly used in bridge construction as applying to the cross-pieces of queen-post trusses, supporting the floor and themselves supported by the truss. Hence (*car-building*), 22, figs. 82-92, etc.; 26, figs. 155-185. The transverse timber, also called *cross-frame tie-timber*, bolted to the under side of the longitudinal sills and floor timbers of a car-body between the bolsters, and to which the body king or queen-posts, or truss-blocks, are attached when truss-rods are used under a car-body.

The terms *body-transom*, *cross-bearer*, *needle-beam* and *cross-frame tie-timber* are all more or less used, but *needle-beam* is perhaps more used than any other one term, and seems more precisely descriptive of its character than any other, besides being the shortest and most easily pronounced.

**Needle-beam truss, or cross-frame truss.** Fig. 224, which see for names of parts.

**Nest-spring.** Figs. 2053-65, etc. A spiral spring with one or more coils of springs inside of it. See *Spiral spring.*

**Netting.** Figs. 696-701. See *Basket-rack netting.*

**Night-latch.** Figs. 995, 1026. A spring door-lock which requires a key to be opened from the outside, but which can be opened from the inside without one. A *spring door-lock*. See *Latch.*

**Niles car-door rim-lock.** Figs. 1006-10. See *Lock.*

**Nine-group spiral spring.** Figs. 2083-4. See *Spiral spring.*

**Nipple.** 1. In mechanics "a small rounded perforated protuberance, as the nipple of a gun."—*Knight*. It is often used, however, in a more general sense.

2. (Pipe fittings.) Figs. 1342; 46-7, 51-2, fig. 311. A short wrought-iron pipe with a screw-thread cut on each end, used for connecting couplings, tees, etc., together or with some other object, as a tank or heater. See *Auxiliary-reservoir nipple. Brake-hose nipple. Solid nipple seat-arm.*

**No-chimney lamp-burners.** Figs. 896-961. A style of

burner so formed as to produce a sufficiently intense draft to avoid the production of smoke without the use of a chimney. Certain *mechanical* burners by means of fans actuated by clock-work do this very effectually, but in general the light is comparatively dim, owing to poor draft.

**Nosing.** 1. (Of a lock.) 8, figs. 987-99, etc. A *keeper*, which see.

2. (Of a stairs.) 2, fig. 686. The part of a tread-board which projects beyond the *riser*.

**Notice-plate.** Figs. 765, 1071, 1099, and in place, 3, fig. 370. Varieties are the *platform* notice-plate, *saloon* notice-plate, etc. See *Name-plate.*

**Nozzle.** See *Tank-nozzle.*

**Number.** Fig. 1233. See *Berth-number.*

**Number-panel.** Fig. 49, etc. See *Name-panel*. Now rarely used on modern cars. The number is simply painted on between horizontal bars, as in fig. 48.

**Nut** (standard sizes for). 1, figs. 1865-7; fig. 1834. "A small block of metal or wood containing a concave or female screw."—*Webster*. Nuts take their name from the bolts, rods or other parts to which they are attached. They are usually either square or hexagonal. A *spanner nut*, which see, is one with eight or more sides. They are usually more truly *couplings* than nuts, properly so called, which screw on to a bolt or rod.

## O

**Oblique closet-hopper.** Fig. 1090. See *Closet-hopper.*

**Officers' car.** Figs. 211, etc. A car for the private use of the higher officers, directors, etc., of railroads in traveling over their lines. They are usually provided with kitchens. They are sometimes very elaborate and costly; sometimes merely business cars. A *pay-car* is a special variety, found on nearly all roads from 300 to 600 miles long.

**Offset-joint** (of running-pipe, Gouge heater, which see). Fig. 1437. When the *back running-pipe* turns down through the floor the offset-joint carries the *front running-pipe* back to the face of the truss-plank, which it follows to the end of the car, where the air is discharged.

**Oil axle-box** (English). A *journal-box* in which oil is used instead of *grease* as a lubricant. The oil is fed to the

- under side of the journal by means of a worsted pad held lightly against the journal by spiral steel springs. See *Axle-box cover*, and *Grease axle-box*.
- Oil-box.** A *journal-box*, which see.
- Oil car.** A car made especially for the transportation of mineral oil. Some oil cars are built like stock cars, for carrying barrels of refined oil. Crude oil, and sometimes refined also, is carried in *tank-cars*, which see, figs. 22, 139-42.
- Oil-cellar.** 28, fig. 2011. A cavity in the lower part of some exceptional forms of journal-boxes for collecting the oil and dirt which runs off the axle at the dust-guard. The oil-cellar is *below* the space occupied by the axle-packing.
- Oil-cup.** 20, fig. 311 ; 40, fig. 298. 1. (Air-cylinder of Westinghouse brake.) A small metal cup attached to an air-pump to hold oil for lubricating an air-piston.  
2. ("American" steam brake-valve.) 12, figs. 360-2.
- Oiler** ("American" steam brake). Figs. 360-2. See also *Automatic lubricator*.
- Oiler-tee** ("American" steam brake-valve). 11, figs. 360-2.
- Oil-lamp.** Figs. 909-25. A cheap metal lamp for burning lard or whale oil. A lamp for mineral oil is an oil lamp but generally not so termed.
- Oil-screws.** Figs. 911-23. Fittings for *oil-lamps*, which see.
- Oil-tester.** Fig. 895. A device for testing the temperature of the flashing and igniting points (so called) of illuminating oils; the temperatures, namely, at which a temporary or permanent blaze takes place when a lighted match is held near the surface of the oil. The *outer reservoir* of the oil-tester is filled with water, and the oil to be tested is put in the *oil-pot* and heated to the temperature desired as indicated by a thermometer.
- Oil-tube** (of student lamp). F, figs. 852-4. The vertical tube in which the wick lies. The horizontal bar is the *feed-tube*.
- One-horse street-car.** Fig. 1840. Also called *bob-tail street-car*. See *Street car*.
- Open-door stop.** 71, figs. 132, 136, 82, 87, 93. A block of iron or wood fastened to the side of a freight car to prevent a sliding-door from sliding too far when opened.
- Opener.** See *Deck-sash opener*. *Ventilator-opener*.

- Open link for Miller hook** (Janney-Miller coupler, which see). 98, figs. 554, 602-35.
- Open-mouth drawbar.** Figs. 448, 453-60. A *Safford* drawbar, which has the head cut away at the sides. See *Drawbar*.
- Open plate-wheel** (street cars). Figs. 2139-40. A light cast-iron *single-plate* wheel, with openings cast in the plate between the ribs. See *Wheel*. *Car wheel*.
- Open return-bend** (pipe fittings). Fig. 1341. A short cast or malleable iron U-shaped tube for uniting two parallel pipes. It differs from a *close return-bend* in having the arms separated from each other.
- Open wagon** (English). Figs. 116-119. American equivalent, *four-wheeled gondola car*. A vehicle with sides and ends from 6 in. to 5 ft. high, and having no roof suitable for the conveyance of freight. A *tarpaulin*, which see, is used to protect the freight from the weather. See also *Wagon*.
- Operators' train-order target lamp.** Fig. 971. A kind of lantern with four large semaphore lenses. The name is inappropriate, as many styles are used for this purpose. See *Signal-lamp*.
- "Opposition" sun-burner.** Fig. 886. See *Sun-burner*.
- Ore-car.** A car made especially for carrying iron or other ores. Ordinary gondola cars, which are sometimes lined with sheet iron, and drop-bottom and tip cars are also used for this purpose.
- Ormolu.** Literally, *ground gold*, a style of bronzing metallic surfaces.
- Ormolu hook** (postal cars). Fig. 1074. A kind of pouch-hook.
- Ormsby sash-balance.** Figs. 1703-7. A device to do away with sash-locks or other equivalent devices by means of a coiled spiral spring placed within a small gear-wheel which engages with a *beveled rack* affixed to the window casing. The bevel of the rack is so shaped as to tend to throw the sash outward and toward the other side, thus preventing rattling. A *detent latch* is provided to hold the spring from uncoiling when the sash is removed, and to enable it to be adjusted to the right tension.
- Ottoman.** Fig. 1164. A carpet-covered movable cushion serving as a foot-rest.
- Outer cone** (graduated bolster-spring). 3, fig. 2095. See *Spring*. *Spiral spring*.



Outer double floor, or floor underlining (English). 143, figs. 204, 205. American equivalent, *deafening-ceiling*. In a carriage, planking attached to the under side of the framing and floor of the body. The space between it and the true floor is generally filled with sawdust. This method of construction is of recent introduction in England and is unusual, but is general in Germany and other colder parts of the continent of Europe.

Outer-hung brake. Figs. 228-35. Brake-shoes and beams attached to the outside of the wheels of a truck or four-wheeled car. When hung between the wheels it is an *inner-hung* brake. Outer-hung brakes were formerly the favorites. The best practice is now tending to inner-hung brakes.

Outflow-pipe (Searle heater). C, figs. 1484-5. All hot-water heaters have a corresponding pipe not named herein.

Outlet-elbow (Gouge heater, which see). Fig. 1469.

Outlet-strainer (Lorenz refrigerator car, which see). G, figs. 130-130 $\frac{1}{2}$ .

Outside ash-pit door (*right and left*), (Johnson heater). 6 and 7, fig. 1472. See *Ash-pit*.

Outside body-truss-rod. When two or more truss-rods are used under each side of a car-body, those farthest from the centre are called *outside body-truss-rods*, in distinction from the *inside* truss-rods.

Outside-casing. 1. (Baker heater.) 6, figs. 1301, 1307. An outside shell made of Russia-iron, and bent and riveted into the form of a frustum of a cone.

2. (Spear heater.) Fig. 1522. Also of Russia-iron, but cylindrical.

3. (Suspended heater.) C, figs. 1529-32. A rough sheet-iron shell, painted.

Outside corner-plate (English). 77, figs. 116-9. A plate placed outside of the body, securing the side and ends together; made, as shown, a continuous plate, or in several knees, each 2 $\frac{1}{2}$  in. deep.

Outside cornice (English). See *Side gutter*.

Outside cylinder (of student lamp). B, figs. 852-4. The sheet surrounding the reservoir.

Outside end-piece (of wooden truck-frame). Figs. 1942-70. The cross-piece next to the end of the car, in distinction from the *inside end-piece*.

Outside fire-door (Johnson heater). 12, fig. 1472. See *Fire-door*.

Outside magazine-door (Johnson heater). 10, fig. 1472. See *Magazine*.

Outside-panel. 67, figs. 155-85; 27, figs. 1843-4. A panel in the outside of a passenger or street car *under* the windows. Those between the windows are called *outside window-panels*. Above the windows comes the *frieze* or *letter-board*. Street cars have *lower* outside-panels, below the outside panels proper.

Outside-sills. 25, figs. 1821-4, etc. The *side-sills*. See *Sills*.

Outside sleeve-collar (Kirby's car-door lock). D, figs. 1003-4. See *Sleeve*.

Outside top (Bissell heater). Figs. 1352-4, 1378-80. The upper cast plate on which the stove-pipe fits. There is also an *inside top*.

Outside top-plate (Spear heater). 10, figs. 1486-90; figs. 1493-5, 1514-6. The top of the outside casing.

Outside transoms (six-wheeled trucks). 22, fig. 1969. The two transoms farthest from the centre of the truck, in distinction from the *middle* transoms.

Outside wheel-bars (iron six-wheel truck). A, figs. 1971-3. The iron substitute for wooden wheel-pieces.

Outside wheel-piece plate. 11, figs. 1968-9. An iron plate fastened to the outside of a wheel-piece to strengthen it. There are two when any are used, *outside* and *inside*. They are usual only on six-wheel trucks.

Outside window-panel. 68, figs. 155-85. See *Outside panel*.

Outside window-sill. 77, figs. 175-6. A horizontal piece of wood or iron under a window on the outside of a car and on which the sash rests.

Outside window-stop. 84, fig. 175; 51, figs. 1843-4. A wooden strip attached to a window-post on the outside of a sash to hold the latter in its place. Often called a *bead*, which see.

Oval-bar spiral-spring. Fig. 2053. One of the many exceptional sections. See *Spiral spring*.

Oval coupling-pin. Figs. 436-45. A *flat coupling-pin*. See *Coupling-pin*.

Overhang (of a roof). D, figs. 667-9. The projection beyond the sides. It is usually smaller than represented in the engraving.

Over-hung door. Figs. 87, 132, etc. A sliding-door which is hung from or supported on a rail above the door. If the door is supported by a rail below it is called an *under-*

*hung door*. Over-hung doors are almost universal for freight cars. See *Door-hanger*. *Car-door hanger*.

## P

**Package-rack** (drawing-room cars). Figs. 699, etc. A small rack analogous to the basket-racks of ordinary passenger cars and the only substitute therefor used in drawing-room cars. It is placed between the windows, within easy reach of the hand, and not above them.

**Packing**. 1. *Journal-packing*, which see.

2. (Atwood hemp-packed wheel, which see.) C, fig. 2167. A mixture of hemp and vaseline put in with a steam hammer.

**Packing-blocks**. 1. (Hoit draw-gear.) 7, figs. 426-427; 186, figs. 113-5. Rectangular blocks gained into the centre-sills and *double-spring drawbar timbers*, and serving the purpose of connecting them firmly together longitudinally. The term is borrowed from bridge work, in which the form of packing-block shown is very common. The bolts passing through the packing-blocks are termed *packing-bolts*.

2. (Thomas steel-tired wheel, which see.) Figs. 2174-6. Truncated triangular blocks of wood forced into *pockets* in the skeleton against which the tire bears.

**Packing-block pockets**. Figs. 2174-6. (Thomas steel-tired wheel, which see.) See also above.

**Packing-expander** (Westinghouse brake). 12, fig. 314, etc., etc. A spring or other contrivance for spreading out the packing of a piston or valve so as to make it fit air-tight. See *Piston packing-expander*.

**Packing-gland**. See *Piston-rod*.

**Packing-leather**. 1. (Of journal-boxes.) Figs. 1997-2020. A *dust-guard* is sometimes called packing-leather.

2. (Westinghouse brake.) 11, figs. 314, etc., etc. A ring of leather used in connection with pistons or other movable parts of machinery to make a steam-tight joint. When so used it is always accompanied with a *packing-leather expander*. A packing-leather for a piston-rod is called a *cup-leather*, and is compressed by a *piston-spring*. See *Piston-packing leather*. *Piston-rod packing-leather*.

**Packing-nut** (Westinghouse brake). See *Piston-rod packing-nut*.

**Packing-nut wrench** (Westinghouse brake). 50, fig. 311. See *Wrench*.

**Packing-ring** (Westinghouse brake). 12, 13, figs. 298, etc., etc. See *Piston packing-ring*. See also *Rubber packing-ring* (for triple valve).

2. ("American" steam driver-brake.) 4, fig. 358-9. The usual type of *piston packing-rings*, which see.

3. (Hose-coupling, Westinghouse brake.) 4, figs. 327-8. An india-rubber ring in a coupling-case, which forms a seat for a coupling-valve, and makes a tight joint between the two parts of the coupling.

**Packing-ring washer** (hose-coupling, Westinghouse brake). 3, figs. 327-8. A circular metal ring which rests on the *packing-ring*, and forms a bearing for the projections on the *coupling-cap* by which the packing-ring is held in place.

**Packing-spring** (for piston-rod of Westinghouse driving-wheel brake-cylinder). 8, figs. 314-5. A spiral spring clutching the *piston-rod cup-leather*, and pressing it air-tight against the piston.

**Padlock**. Figs. 1029-37. A loose lock having a semi-circular *shackle* jointed at one end so that it can be opened, the other end of the link being locked when desired by the entrance of the *sliding-bolt* into it. Such locks are used to secure a *hasp* or the like on a *staple* or similar device by passing the link through the staple. A *spring padlock* is one which snaps shut and locks by pressure only. A *dead padlock* has no springs.

**Padlock-hasp** (car-door fastener). B, figs. 1108-9. See above.

**Padlock-hole** (car-door fastener). 4, fig. 1109.

**Paige steel-tired wheel**. Figs. 2169-71. A type of steel-tired wheel of recent introduction, the hub and skeleton (*wheel-centre*) being in one piece, and the tire secured thereto by *front* and *back face-plates*, *hub-bolts* and *tire-bolts*. It has no retaining-ring.

**Painting** (of passenger cars) consists usually of the *priming*, *rough-stuff* or *scraping-filling coats*, *color coats* and *varnishing*, all of which see. The care and expense devoted to the process and the order and number of the various coats are often varied, but the following is among the most approved processes, and the order of the coats



and time required for each coat to dry are about as follows :

	Hours.
Priming (which see) with drier.....	24
Scraping-filling coat (2 coats).....	48
Color coats (which see) (3 coats).....	72
Color and varnish.....	24
Striping.....	24
Finishing varnish (which see) (2 coats).....	96

Total..... 288

For specifications of fair average practice in painting freight cars, see fig. 93.

**Pair of trucks.** A *pair* of trucks means two truck-frames, each with two or more pairs of wheels, etc., complete for an entire car, and does not mean *one* truck-frame with wheels and axles for one end of a car only.

**Pair of wheels.** This term is used to designate two car-wheels fitted on one axle, *including* the axle.

**Palace-car.** Figs. 52-5, 60-1. An extravagant term used to designate sleeping, drawing-room, parlor and chair cars, which see, which are fitted up with more than the ordinary amount of ornament and elaborate finish and furniture.

**Palace stock-car.** An extravagant general term applied to cars designed for carrying stock with less injury and greater comfort than the common stock-car. None of them are in very wide general use, and no illustrations are consequently given. At a competitive examination of the various designs by the American Humane Association (Abraham Firth, Secretary, Boston, Mass.) the following cars were given gold medals as being the most meritorious designs :

A. C. MATHER, Chicago, Illinois.  
W. STUART HUNTER, Belleville, Canada.  
J. M. LINCOLN, Providence, Rhode Island.  
MONTGOMERY PALACE CAR CO., New York City.  
BURTON STOCK CAR CO., Boston, Massachusetts.  
THOMAS CLARKE, Truro, Nova Scotia.  
JOHN W. STREET, Chicago, Illinois.

**Pan.** 1. (Refrigerator cars.) 4, figs. 130, etc. The *ice-pan*.

2. (For water alcove.) 2, fig. 1594.

3. (Howard's parlor-car water-closet.) Figs. 1087-89. The basin forming the bottom of the bowl, so constructed that it is only brought into position and filled with water on raising the lid.

**Panel.** 1. A board inserted in the space left between the *stiles* and *rails* of a frame or between mouldings. Sometimes metal plates are used for this purpose. *Door-*

*panels*, fig. 370, in passenger-cars are usually only the *middle* and *lower* or *twin* door-panels. The upper door-panel is usually of glass. *Window-panels* come *between* the windows and are distinguished as *outside* and *inside*. *Wainscot-panels* come below the windows between the upper and lower wainscot rails. Other interior panels are *deck-side panels* and *end-panels*, the latter sometimes called *ventilator-panel*, and the *end-roof panel* over the door. The exterior panels are the *end-panel* below the windows and the *end-window panel* alongside of the window. A *name-panel*, which see, has been formerly much used, but is now becoming obsolete. In street cars additional panels to those above named are an *upper-end panel*, which also sometimes occurs in passenger cars, a *lower outside-panel* below the outside panels proper; *inside frieze-panels*, *end-seat panels* and *door-case seat-panels*, and *top-panels*.

2. (Of a truss.) The space between two vertical posts or braces and the two chords of a truss. The distance *a*, *b*, figs. 2185-6, is a panel.

3. (English.) In a carriage, the outside sheathing of the body. Teak and mahogany are generally used for this purpose in England, and sheet-iron on the continent of Europe. See *Bottom door-panel*. *End-panel*. *Quarter-light panel*.

**Panel ceiling.** Properly any form of ceiling divided up into panels, but in popular custom used as synonymous with *wood ceiling*, which is always divided into panels, in distinction from a *head-lining* of canvas.

**Panel-frame.** Figs. 49, etc. See *Name-panel frame*. (Now almost obsolete.)

**Panel-furring.** 59, figs. 155-85; 33, fig. 1844. Horizontal bars or strips of wood between the posts of a passenger car, and to which the outside panels are nailed. When a strip is made continuous and extends from one end of the car to the other, and is notched into the posts, it is called a *panel-rail*. *Window-panel furring* is included in the general term, and is that coming between the window-posts.

**Panel-lamp.** Fig. 864. An *alcove-lamp*, which see.

**Panel-pin** (English). A small headless nail of copper, brass or iron, used to secure the outside sheathing (*panel*) of a passenger car to the framing of the body.

**Panel-rail.** 66, figs. 155-85. See *Panel-furring*.

**Panel-strip.** 69, figs. 155-85; 32, fig. 1843. A narrow

- piece of wood or metal with which the joint between two panels, or a panel and a post, on the outside of a car, is covered.
- Paper-hook** (for saloons). Fig. 1095. A hook for carrying closet paper in sheets. A carrier for perforated continuous-roll paper, in large and increasing use, is not shown.
- Paper seal-holder**. Fig. 1015. A style of seal-holder of which several patterns exist, in which a sheet of paper or printed label is used to protect the lock against unauthorized opening. The paper is usually protected by glass.
- Paper wheel**. More properly, *Allen paper wheel*. Figs. 2159-61. A car-wheel with a steel tire and a centre formed of compressed paper held between two plate-iron *face-plates*. It is in large and increasing use. The compressed paper can be turned and polished like the hardest wood.
- Paragon spiral-spring**. Figs. 2063 $\frac{1}{2}$ -4. A spiral car-spring made of a bar of metal whose section resembles a figure 8, wound on a mandrel edgewise. It is practically obsolete.
- Parallel brake-hanger**. 15, figs. 236, 246-51. A link attached to a brake-beam so as to cause the latter and the brake-head and shoe to maintain the same relative positions when the brakes are released, so as to prevent the ends of the brake-shoes from coming in contact with the wheel when the brakes are released. It is attached to the truck-frame *end-piece* by a projecting *parallel brake-hanger carrier*, and to the brake-beam by an *eye*.
- Parallel brake-hanger carrier**. 16, figs. 236, 245, 249, 251. See above.
- Parallel brake-hanger eye**. 17, figs. 236, 245-51. See above.
- Parcel-net** (English). 194, figs. 204, 205. American equivalent, *basket-rack*. In a carriage, a netting placed transversely above the seats for the purpose of carrying light baggage, parcels, etc. The front edge is attached to a wooden bar called the *parcel-net rod*, which is supported by a *bracket*.
- Parcel-net bracket** (English). 193, figs. 204, 205. See above.
- Parcel-net rod** (English). 192, figs. 204, 205. See above.
- Parcel-rack**. See *Basket-rack*, figs. 696-701.
- Parcel-van** (English). American equivalent, *express-car*.

A closed vehicle adapted to run on passenger trains and to carry parcels and packages, rather than passengers' baggage. Such business in England is done by the railway companies themselves, and not by separate corporations.

**Parliament-hinge**. Fig. 786. See *Hinge*.

**Parlor car**. Figs. 52-3, 210-11, 695, etc. See *Drawing-room car*. The names *parlor car*, *drawing-room car* and *chair car* are all used somewhat indiscriminately, but *chair car* ordinarily refers to a parlor car with adjustable chairs, for riding in which no extra fare is charged. Parlor and drawing-room cars are usually run by separate companies. See *Bay-window parlor car*, fig. 210, and frontispiece.

**Parlor-car chairs**. Figs. 1154-66. The most common type of chair for parlor cars is a simple arm-chair revolving on a *pivot* which enters a fixed *pedestal*. The *Hartley* and *Horton* chairs, which see, have for some reason been mainly confined to a class of parlor cars run without extra charge as ordinary first-class passenger coaches. See above.

**Parlor-car water-closet** (Howard's, which see). Figs. 1087-9.

**Parting-bead, or parting-strip**. 16, figs. 692-5. A long thin piece of wood which acts as a distance-piece between two objects, as a window and a window-blind. See *Sash parting-strip*.

**Parting-rail** (of door frame, which see). 7, fig. 370. A vertical rail between the bottom and middle or middle and top rails of a door or partition, dividing a panel into *twin-panels*.

**Partition** (English). 130, figs. 204, 206, etc. A vertical division dividing the interior of the body into separate compartments, generally extending completely across the vehicle from side to side, and from floor to roof, but occasionally made to extend only some four or five feet from the floor, leaving a clear space between the top and the roof. This practice is, however, going out of favor.

**Partition-stop** (for door-holder). Figs. 763, etc. So called in distinction from a *floor-stop*, with which a *door-holder*, which see, engages.

**Partition-wall** (Mann boudoir cars). 16, figs. 680-1. The wall between the separate boudoirs.

**Passenger car or coach**. Figs. 48-9, 62-3, 154-214. See



also *round-cornered passenger car*, figs. 1529-30. Literally, a car used for carrying passengers, but in popular practice restricted to ordinary vehicles for day travel in distinction from *sleeping cars*, and sometimes in distinction from the more luxurious *parlor cars*, *drawing-room cars* or *chair cars*, which see, as well. Passenger cars are also very commonly termed *day coaches* or "*first-class*" coaches. *Second-class* coaches are very rarely run, although there are large numbers of *emigrant cars*. One *smoking car* is usually attached to all trains. See *Car. Coach*.

**Passenger-car truck.** Figs. 1955-69. A truck for carrying a passenger-car body. Such trucks are usually wooden frame and have two sets of springs, *bolster springs* under the truck-bolster between the two truck-frames and *journal-springs* (in four-wheel trucks) or *equalizer-springs* (in six-wheel trucks) attached to the outside truck-frames. They always have swing-bolsters. Iron passenger truck-frames are occasionally used, especially for six-wheel trucks, which latter are almost always used for sleeping and parlor cars. Other passenger cars usually have four-wheel trucks. See *Truck. Car-truck*.

**Passenger couplers.** Figs. 537-643, showing the *Cowell*, *Janney*, *Janney-Miller* and *Miller* couplers. The *Blackstone* coupler, which see, is in use on one road only. The Miller is by far the leading coupler at the present time, and either the Miller or Janney is used on practically the entire passenger equipment of the United States. See *Automatic car-coupler*.

**Pasting lace (English).** Figs. 204, 205. An ornamental woolen fabric, made in bands about  $\frac{1}{2}$ -inch wide, and used to finish and cover the seams and joints in upholstery against the woodwork of a carriage round the *quarter-lights* and *front seat-rail*, and to form borders to the *broad lace* above the *back squabs*. It is fastened by tacks driven in the tape edge, the main part being then turned over to hide the tacks, and pasted in position. See also *Seaming lace*.

**Patent overflow (for wash-basins).** Fig. 1065. A tube formed in the basin itself for connecting the upper waste holes with the regular waste pipe from the bottom of the basin, so that but one pipe connection need to be made.

**Patent waste.** A preparation of cotton-seed hulls used for journal packing. See *Elastic fibre*.

**Paul flexible window-blind.** See note to fig. 1645. A device to enable the window-blind to be made in one piece and to slide up when raised into a pocket under the roof. It consists essentially of slats with alternate concave and convex edges united by a strip of spring brass. See *Wilson flexible window-blind*.

**Pawl.** 1. (For brake ratchet-wheel.) 2, fig. 241; 8, fig. 254, etc. "A pivoted bar adapted to fall into the notches or teeth of a wheel as it rotates in one direction, and to restrain it from back motion. Used in windlasses, capstans and similar machinery."—*Knight*.

In most of the English dictionaries *ratchet* is given as another name for pawl, but this is believed to be incorrect, according to present practice. See *Ratchet-wheel*.

2. (For ratchet-wheel of winding-shaft.) 131, fig. 105. See above.

**Pear-shaped lamp-globe.** Fig. 952. See *Lamp-globe*.

**Pedestal.** 1, 5, figs. 1942-7, 1955-69; 18, figs. 2002-3. M. C. B. standard, figs. 2021-4. A casting of somewhat the form of an inverted letter  $\eta$  bolted to the *wheel-piece* of a truck-frame, to hold the journal-box in its place, while permitting a vertical movement. The two projections of a pedestal are called *pedestal-horns*, and the space between them a *jaw*, which is closed at the bottom by a *jaw-bit*, which see. In Great Britain, pedestals are called *axle-guards* on cars and *horn-plates* on locomotives, and are there made of wrought-iron.

2. A casting serving as a fulcrum. See *Equalizing-bar pedestal* (caboose cars, etc.) *Leader-trunnion pedestal* (pile-driver cars).

3. (Hartley and other revolving chairs.) 12, figs. 1154-8. The stand by which the chair is supported consists of three portions, *base*, *column* and *seat-frame*.

**Pedestal-box.** A *journal-box*, which see. Figs. 1997-2020.

**Pedestal-brace.** 8, figs. 1955-69. A diagonal bar or rod staying the lower end of a pedestal longitudinally. It is often combined into one piece with a *pedestal tie-bar* to form a *pedestal brace-tie-bar*.

**Pedestal brace-tie-bar.** 166, fig. 105; 8', fig. 1959. A *pedestal-brace* and a *pedestal tie-bar* combined in one piece. See above.

**Pedestal-horns.** 100, fig. 2025; 19, fig. 2003. See *Pedestal*.

**Pedestal-jaw.** 101, fig. 2025. It is closed at the bottom by a *jaw-bit*. See *Pedestal*.

**Pedestal-spring.** Fig. 2091. (Coal cars.) Fig. 2093. (Street cars.) Fig. 2089. A *journal-spring*, which see.

**Pedestal stay-rod.** 167, figs. 102-8, 143; 7, figs. 1963-9. A transverse rod connecting the pedestal tie-bars on each side of a truck so as to prevent them from spreading apart.

**Pedestal tie-bar.** 168, fig. 102; 6, figs. 1907-70, 2025-30. An iron bar or rod bolted to the bottom of two or more pedestals on the same side of a truck or car, thus holding or tying them together. The pedestal tie-bar is sometimes curved downward and called *bottom arch-bar*, as in fig. 1788, and sometimes given a half-turn for additional stiffness, as in fig. 1918. It is also sometimes combined with a *pedestal brace* to form a *pedestal brace-tie-bar*, which see.

**Pedestal-timber.** 1. (Four-wheel cahoeses, etc.) 169, figs. 102-4. A longitudinal timber sometimes used on four-wheeled cars, which is placed under the floor or alongside the sill and to which the pedestals are bolted.

2. 10, figs. 1941-70. A term sometimes used to designate the *wheel-piece* of trucks, which see.

**"Penfold" card-rack** (freight cars). Fig. 1048. A rack for carrying *destination cards*, which see.

**Perch.** 26, fig. 143. Another name for the draw-timbers of a tip-car, on which the floor is not directly built. The name comes from the *perch* of wagons connecting the front and hind running-gear. See *Car perch*.

**Perforated inside-top** (Johnson heater). 24, fig. 1472. (Bissell heater.) Fig. 1383.

**Perforated-rubber floor-mat.** Fig. 806. Another style is the *corrugated-rubber floor-mat*.

**Perforated smoke-pipe casing.** 9, fig. 1489. An outside pipe which incloses the smoke-pipe of a stove, perforated with holes through which the air circulates, and thus comes in contact with the pipe. The casing also protects the wood-work of the car from radiated heat.

**Perforated veneer.** Figs. 1131-9, etc. A form of seat-covering which consists of three and sometimes four layers of wood veneering, glued together and perforated with holes for ornament and ventilation. It is in very general use for the seats of second-class and smoking cars.

**Phosphor-bronze.** "A term applied to any alloy of bronze or brass (which see), or to a triple alloy of copper, tin and zinc, which has been given special purity and excel-

lence by skillful fluxing with phosphorus. It is supposed that the presence of phosphorus gives the tin a crystalline character which enables it to alloy more completely and strongly with the copper. Whether for this reason or not, the phosphor-bronzes, when skillfully made, are greatly superior to unphosphorated alloys."—*Thurston*.

**Piece.**

See *Centre-piece*.  
*Distance-piece*.

*End-piece*.  
*Wheel-piece*.

**Pilaster.** 1. (Architecture.) "A square pier, like a flat column built against a wall, and having cap and base."—*Knight*.

2. (Car construction.) Fig. 654. Any stick or timber fastened against another piece to serve merely as the supporting block or a cross-piece, as *pilaster* (pile-driver car). 5, figs. 1821-4.

**Pilaster-pocket** (pile-driver car). 16, figs. 1821-4.

**Pile-driver car.** Figs. 1821-4. A class of cars, one of which at least is kept upon most large railways, built in a great variety of forms as respects the details, but all in substance similar to the engraving shown. The essential features of a pile-driver car are the *swinging-platform*, or *upper-platform*, 27, carrying the *cabin* and frame-work upon which the *leaders* and *hoisting-engine* and the accompanying gear are carried. The swinging-platform is to enable piles to be driven at a considerable distance from the rails on either side. To enable the cabin to be swung through a wider arc, adjustable *wings* 20 are fixed to the side of the car which are removed when not required for use by the *crane* 34. The leaders are usually long enough to take a 35 to 40 ft. pile and swing upon *leader-trunnions* 15, so that the leaders may be dropped back upon the roof of the cabin for transportation over the road. The *hammers* are usually very heavy, 4,000 to 4,500 lbs.

**Pile-hoisting sheave** (pile-driver car). 11, fig. 1821-4. A wheel placed at the side of the main sheave for use in hoisting piles. It projects a little further forward than the other, so as to swing the pile more easily clear of the leaders.

**Pillar.** 1. "A kind of irregular column.

2. "A supporter; that which sustains or upholds; that on which some superstructure rests."—*Webster*. See *Transom-pillar*.

**Pillar crane.** Fig. 145. A style of crane (largely used on



wrecking cars), having the mast supported from below, either by a *mast-pocket*, fig. 77, or a *base-plate*, figs. 80, 151. See *Derrick*.

**Pillow-box** (Mann boudoir cars). *G*, figs. 680-1. (Sleeping cars.) 31, figs. 676-81.

**Pin**. "A peg or bolt of wood or metal having many uses."  
—*Knight*. In railroad service the word, when used alone, commonly means a *coupling-pin*, figs. 436-46.

See also *Brake-block pin*. *Journal-box-cover hinge-pin*.  
*Centre-pin*. *pin*.  
*Door-pin*. *Lateral-motion spring-pin*.  
*Head-block pin*. *Platform-lever pin*.  
*Hanger-pin*. *Push-bar pin*.

**Pinion**. 1. The smaller cog-wheel of two wheels in gear. See *Shifting-pinion*, 13, figs. 77-8; *W*, figs. 151-3.

2. (Hand-car.) 4, figs. 1720-2; 10, figs. 1724-6. A small gear-wheel attached to the axle of the car, into which the larger wheel on the *crank-shaft* gears.

3. Pinion is sometimes incorrectly used in the sense of a small *pivot-pin* or *journal*, as *C*, fig. 1705.

4. (For geared car-seat, which see.) Fig. 1142.

**Pintle**. 27, figs. 1724-6. "A pivot pin, such as that of a hinge. The king-bolt of a wagon."—*Knight*. See *Brake-lever pintle* (hand-car). Also 5, figs. 77-78.

**Pintsch gas apparatus**. Figs. 812-27. An apparatus in extensive use in Europe and recently introduced into this country, which uses a very heavy gas made from crude petroleum of about .75 sp. gr., ordinary gas being about .44 sp. gr. The gas is compressed to about ten atmospheres, or 147 lbs. per sq. in., and admitted at this pressure into the recipients *H*, fig. 812. It is fed to the lamps at a pressure of about one and three-quarters of water, the reduction being effected by the pressure regulator, fig. 813. The peculiar merits claimed for the apparatus are the ingenious pressure regulator, the system of compressors, the kind of gas used, the burners below described, and some of the details, as the lead and rubber washers, figs. 824-5. Crude petroleum is used as the cheapest oil, but others may and have been used.

**Pintsch gas-burner**. Fig. 816. A centre lamp for burning gas, the essential features of which are the closed *globe* at the bottom, the white porcelain *reflector* *C*, above the flames near the top of the globe, and the peculiar method of supplying air. The air enters through *air-feeders* *A*, on the upper half of the lamp, and after

passing upward, descends through the *inclosing-cylinder* *B*, in close contact with the chimneys *D*, whence it enters the globe *G*, close to the *globe bezel* *F*, and is heated to a high temperature which is claimed to increase the efficiency of the lamp nearly 60 per cent. The burner is protected by a *wind-guard* *P*, at the top, having perforations to permit the escape of the gases of combustion, and is supported by *lamp-arms* *E*. The supply of gas is controlled by the stop-cock *R*. The *burner-tips* *N* are of somewhat peculiar construction, making a flame more similar to a large candle flame than to an ordinary gas flame, so that a very small perforation in the reflector is sufficient to permit the gases to escape without soiling its surface. The lamps are constructed with one, two, four and five burners, one being most usual in Europe and four in the United States.

**Pintsch side-light** (for saloons). Figs. 814-15. See above. The centre and side-lights do not differ in principle.

**Pipe**. "A tube for conveyance of water, air or other fluids."—*Knight*. The wrought-iron pipes used for conveying gas, steam, etc., and commonly called *gas-pipe*, is usually meant by compound words beginning with pipe, as below.

See <i>Brake-cylinder pipe</i> .	<i>Running-pipe</i> .
<i>Brake-pipe</i> .	<i>Signal-pipe</i> .
<i>Cold-air pipe</i> .	<i>Smoke-pipe</i> .
<i>Conductors'-valve discharge-pipe</i> .	<i>Steam-pipe</i> .
<i>Conductors'-valve pipe</i> .	<i>Stove-pipe</i> .
<i>Deflector-pipe</i> .	<i>Supply-pipe</i> .
<i>Discharge-pipe</i> .	<i>Triple-valve branch-pipe</i> .
<i>Exhaust-pipe</i> .	<i>Waste-pipe</i> .
<i>Guard-pipe</i> .	<i>Water drip-pipe</i> .
<i>Hot-air pipe</i> .	<i>Urinal drip pipe</i> .
<i>Injector-pipe</i> .	<i>Urinal ventilating-pipe</i> , etc.

**Pipe-bushing**. Figs. 1325, etc. See *Bushing*.

**Pipe-clip**. 22, fig. 273; 1345. See *Clip*.

**Pipe-collar** (Searle heater). Near *K*, figs. 1484-5.

**Pipe-collar register** (Searle heater). Near *K*, figs. 1484-5. An opening by which to regulate the draft.

**Pipe-coupling**. Fig. 1347. A short cast-iron tube with a thread cut on the inside at each end, which is screwed on the ends of two pipes and used for uniting them together, or uniting one pipe with another object, as a cock or valve. In some couplings the thread at one end is right-hand and the other left-hand, but generally they are both right-hand threads. Also see *Reducing pipe-coupling*.

**Pipe-fittings.** Figs. 1327-48, etc. The connections for systems of wrought-iron gas and steam pipes. The more usual pipe-fittings are *bushings, elbows, tees, return-bends* (close or open), *reducers, couplings, nipples, plugs, clips*, etc., which see in Dictionary.

**Pipe-reducer.** See above. *Bushings, tees and couplings* may be and are all so made as to serve as reducers.

**Pipe screw-threads.** Screw-threads used for connecting wrought-iron pipes together. Such screws are cut "tapered;" that is, the end of the pipe, or the inside of the coupling where the thread is cut, forms part of a cone, so that in screwing up the pipe a tight joint can be made. Pipe-threads are of a V-shape, sharp at the top and bottom, and their sides stand at an angle of 60° to each other. The following is the number of threads per inch for pipes of different sizes. The size is given by the inside diameter, but the actual bore of the smaller sizes is considerably larger than the nominal. The exterior diameter of ordinary gas-pipe is from .27 to .37 in. greater.

AMERICAN STANDARD SYSTEM OF PIPE THREADS.

(The European standard is the *Whitworth* pipe-thread, which is quite different).

*Taper of Thread  $\frac{3}{4}$  in. per foot.*

Size of pipe.	Outside diam-eter. Ins.	Inside diam-eter. Ins.	Inside diam. Extra strong. Ins.	Inside diam. Double extra strong. Ins.	Threads per inch.	Whitworth's thread.
$\frac{1}{8}$ in.	.405	.27	.205		27	28
$\frac{3}{8}$ "	.54	.364	.294		18	19
$\frac{1}{2}$ "	.675	.494	.421		18	19
$\frac{3}{4}$ "	.84	.623	.542	.244	14	14
$\frac{7}{8}$ "	1.05	.824	.736	.422	14	14
1 "	1.315	1.048	.915	.587	11 $\frac{1}{2}$	11
1 $\frac{1}{4}$ "	1.66	1.38	1.272	.884	11 $\frac{1}{2}$	11
1 $\frac{1}{2}$ "	1.9	1.611	1.494	1.088	11 $\frac{1}{2}$	11
2 "	2.375	2.067	1.933	1.491	11 $\frac{1}{2}$	11
2 $\frac{1}{2}$ "	2.875	2.468	2.315	1.755	8	
3 "	3.5	3.067	2.892	2.284	8	
3 $\frac{1}{2}$ "	4.	3.548	3.358	2.716	8	
4 "	4.5	4.026	3.818	3.136	8	
4 $\frac{1}{2}$ "	5.	4.508			8	
5 "	5.563	5.045			8	
6 "	6.625	6.065			8	
7 "	7.625	7.023			8	
8 "	8.625	7.982			8	
9 "	9.688	9.001			8	
10 "	10.75	10.019			8	

**Pipe-stay** (Creamer brake, which see). 16, fig. 263.

**Pipe-clip, or strap.** Figs. 1333, 1345. An iron band for fastening a pipe against or to some other object. They are usually single, but sometimes double, for two or more pipes. See *Clip*.

**Pipe-support** (Baker heater). Fig. 1332. A cast-iron stand screwed to the floor, with a receptacle at the top to receive and hold a pipe.

**Pipe turnbuckle.** Fig 1882. See *Turnbuckle*.

**Piston.** A metal disk with packing, etc., made to fit air-tight and work back and forth in a cylinder. Those shown in this volume are chiefly in connection with *air and steam brakes*, figs. 266-358, to which more detailed reference seems unnecessary. The piston consists of a *piston-head* attached to a *piston-rod*. The *piston follower* or *follower-plate* lies at the back of the piston-head, inclosing between them the *piston packing-rings*, or (in the Westinghouse car brake-cylinders) the *piston packing-leather*, which latter is provided with a *packing-leather expander*. The follower-plate is held on with *follower-bolts*. All these parts are essentially the same in all the various cylinders shown, and for distinctness should be designated with the name of the cylinder within which they work. The *reversing-piston*, which see, of the Westinghouse brake, shifts the main steam-valves which admit steam to the cylinder. See also *Triple-valve piston*, etc., of Westinghouse apparatus.

**Piston-packing expander** (Westinghouse brake). 9, figs. 329-33; 12, figs. 314-5, etc. See below.

**Piston packing-leather** (Westinghouse brake). 9, figs. 329-33. A circular ring of leather used as a substitute for *piston packing-rings*, which see, pressed into the cylinder so as to have an L-section, which is attached to and surrounds the piston and bears against the inside surface of the cylinder, being pressed against it by a round steel rod called the *piston-packing expander*.

**Piston packing-ring.** 12-13, fig. 298; 9, fig. 299; 4, figs. 353-9, etc. A circular metal ring of rectangular section which is placed in grooves in the edge of a piston-head to make it work air-tight in its cylinder. The rings are turned slightly larger than the cylinder and cut in two diagonally at one point, so that when compressed they will tend to spring open.

**Piston-rod cup-leather** (Westinghouse driving-wheel brake). 7, figs. 314-15. A circular ring of leather similar



to the *piston-packing leather*, which see, used to pack the piston-rod instead of the ordinary gland and stuffing-box of steam machinery.

**Piston-rod nut** (air-pump of Westinghouse brake). Figs. 298-9. A screw-nut on the lower end of the piston-rod, which holds the piston on the rod. ("American" steam driver-brake, 12, figs. 363-5.

**Piston-rod packing-gland** (air-pump of Westinghouse brake). 28, figs. 298-9. A metal ring which encircles the piston-rod, and which is forced into the stuffing-box and against the packing, which is then compressed by the *packing-nut* 27.

**Piston-rod packing-nut**. 1. (air-pump of Westinghouse brake.) 27, figs. 298-9. See above.

2. (Westinghouse driving-wheel brake.) 6, figs. 314-15, 322. A nut which is used for holding the piston-rod cup-leather in its place, which thus makes an air-tight joint in which the piston-rod works.

**Piston-rod packing-spring** (Westinghouse driving-wheel brake cylinder). 8, figs. 314-5. A spiral spring serving to compress the *piston-rod cup-leather*.

**Piston-rod pin** ("American" bell-crank steam driver-brake). 28, figs. 363-5. A pin connecting the two links to the extremity of the piston-rod.

**Piston-sleeve** (Westinghouse tender-brake). Fig. 307 ; 6, fig. 330. A hollow casting resembling a tube attached to the end of the piston-rod. Its purpose is to guide the *push-rod* against which the piston-rod bears, so that when the hand-brakes are applied the push-rod can move away from the piston-rod without moving the latter. A substitute for this awkward attachment is to slot the end of the piston-rod cross-head, as in fig. 337.

**Piston-valve** (Westinghouse pump-governor). 10, fig. 316.

**Pit**. See *Ash-pit*.

**Pits** (Atwood's hemp-packed wheel, which see). Fig. 2163. The depressions on the inner surface of the tire to give bond to the hemp packing.

**Pitch**. 1. (Of a screw.) The advance made by the thread in one complete revolution, usually expressed by the number of threads in a given space, as (in U. S. and England) an inch. *Gauge for fig.* 1831.

Of a roof.) The rate of slope. The roof in fig. 261 slopes 1 to 8

*itch-chain*. 45, figs. 1822, etc. One composed of alternate

single and double metallic plates bolted and riveted together, sidewise, usually intended to work in the teeth of wheels, shaped so as to accurately engage with the chain. Such chains are sometimes used for *berth-chains*.

**Pitch-gear** (for pile-driver car). 45, fig. 1822. See *Pitch-chain* and *driving-chain*.

**Pitching-roof**. Figs. 90-6, 134-5, 138. A roof formed of one or more inclined plane surfaces. The term, as also the term "A" car-roof, which see, when the pitch becomes steep, is used to distinguish a roof formed of plane surfaces from one formed of curved or arched surfaces.

**Pivot**. 1. "A pin or short shaft on which anything turns."—*Webster*. *Seat-arm* pivots are also inaccurately called *rivets*.

See <i>Deck-sash pivot</i> .	<i>Rocker-pivot</i> .
<i>Lower swing-hanger pivot</i> .	<i>Seat-arm pivot</i> .
<i>Monitor deck-sash pivot</i> .	<i>Upper-berth-rest pivot</i> .
	<i>Ventilator-pivot</i> .
<i>Ratchet-pivot</i> .	<i>Upper swing-hanger pivot</i> .

2. (Of padlock hasp, car-door fastener.) 7, fig. 1109. The pin on which the hasp turns.

3. (For geared car-seat, which see.) Fig. 1142. The pin by which the rocking seat-bottom is supported.

4. (Monitor deck-sash pivot.) E, fig. 1623. Also in fig. 1642. The pin held in place by a spring upon which the deck-sash turns.

5. (Of rack-tumbler spring padlock.) 6, fig. 1031. More properly the *key-pin*.

**Pivot-bearing**. 49, figs. 1955-73. See *Swing-hanger pivot-bearing* (passenger-car trucks).

**Pivoted seat-arm** (Cobb's, which see). Figs. 1132-3, 1171. A seat-arm which is attached to the seat-back by a loose pivot, instead of by a rigid connection, enabling the seat-back to be thrown higher without increasing its total width.

**Pivot-plate**. See *Seat-arm pivot-plate*. *Window pivot-plate*. *Ventilator pivot-plate*.

**Pivot-rod** (Ormsby sash balance). B, fig. 1703.

**Pivot spring** (Monitor deck-sash pivot). H, fig. 1623. The spring retaining the pivot in its proper place after the sash has been placed in position.

**Plunished iron**. One of the attempted substitutes for *Russia iron*. One of many processes consists of the formation of an oxidized surface on each sheet over

and above the surface secured in ordinary working. The oxidized surface is then reconverted into metallic iron, which will enter readily into combination with an oxidizing agent applied throughout. The surface thus given to the sheet is fixed by planishing or hammering until the desired polish is secured. The recent imitations of Russia iron have been very successful, but nothing yet made out of Russia is quite as good as the original.

**Plank.** "A broad piece of sawed timber, differing from a board only in being thicker. In America, broad pieces of sawed timber, which are not more than an inch or an inch and a quarter thick are called *boards*; like pieces from an inch and a half to three or four inches thick are called *planks*."—*Webster*.

See *Spring-plank*.

*Truss-plank*.

**Plank car-roof.** Fig. 664. More commonly *single-board roof*, which see. See also *Car-roof*.

**Planted moulding, or bead moulding (English).** 121, figs. 205, 207. American equivalent, *panel-strip moulding, or bead moulding*. In a carriage, a small moulding which is pinned on the body, and is not worked out of the solid on the post or rail, as is a *wrought moulding*, which see.

**Plastered-lamp.** A lamp with a fixed globe which is fastened to a lamp-frame with plaster of Paris. Fig. 828 is such a lamp.

**Plate.** 1. A piece of metal flat or extended in breadth.

See *Base-plate*.

*Berth-rest plate.*

*Berth-latch face-plate.*

*Body-bolster truss-plate.*

*Bolster-plate.*

*Bottom stove-plate.*

*Brake-block suspending-plate.*

*Buffer-block face plate.*

*Buffer-plate (Miller).*

*Centre-plate.*

*Chafing-plate.*

*Chair-arm plate.*

*Corner-plate.*

*Coupling-pin plate (Miller).*

*Cover-plate.*

*Dead-plate.*

*Deck-sash pivot-plate.*

*Door-button plate.*

*Door-hook plate.*

*Door-sash plate.*

*Inside top-plate.*

*Inverted truss-rod plate (street cars).*

*King-bolt plate.*

*Letter-box plate.*

*Match-plate.*

*Mirror-plate.*

*Name-plate.*

*Notice-plate.*

*Outside top-plate.*

*Outside wheel-piece plate.*

*Piston follower-plate.*

*Pivot-plate.*

*Reversing valve-plate.*

*Sash-lock plate.*

*Seat-arm pivot-plate.*

*Seat-lock plate.*

*Sliding-door-latch plate.*

*Slanting table-leg plate.*

*Stop-plate.*

*Drawbar chafing-plate (Miller).*

*Drawbar face-plate.*

*Drawbar follower-plate.*

*Drawbar friction-plate (street cars).*

*Draw-hook plate.*

*Drop letter-box plate.*

*Face-plate.*

*Flag-holder plate.*

*Follower-plate.*

*Friction-plate.*

*Frieze ventilator-plate.*

*Hopper-plate.*

*Inscription-plate.*

*Strike-plate.*

*Suspending-plate.*

*Table-hook plate.*

*Table-leg-hook plate.*

*Threshold-plate.*

*Transom chafing-plate.*

*Truck-bolster chafing-plate.*

*Uncoupling-lever plate.*

*Uncoupling-lever trunnion-plate.*

*Upper berth-rest plate.*

*Ventilator pivot plate.*

*Wheel-piece plate.*

*Winding-shaft plate.*

2. (Architecture.) "A piece of timber which supports the ends of the rafters."—*Webster*.

3. (Car-building.) 46, figs. 82-102; 98, figs. 155-85; 47, figs. 1843-4. A horizontal piece of timber on top of the posts of a car-body supporting the roof carlines or rafters. Also sometimes called *side-plate* in distinction from an *end-plate*, which see, which is a similar stick across the end of the car. A *deck-plate* is used to cap the deck-posts of an upper-deck. Main carlines, which see, are sometimes called *tie-plates*. In refrigerator cars *bogus-plates*, which see, are used.

4. (Of a cast car-wheel.) Figs. 2124-78. The central portion connecting the hub and tread, sometimes *single-plate*, sometimes *double-plate*. The plate is stiffened by *brackets*. See *Car-wheel* and *face-plate* (steel-tired wheel). **Plate, or laminated, buffing and draw-spring (English).**

51, figs. 117 and 206. A large *half-elliptic* spring which spans the distance between the two *buffer-rods* and takes the buffing strains. It is also connected in the centre to the *drawbar* and takes the draft strain.

**Plate-bolt strip (freight cars).** 189, figs. 94-5. A longitudinal strip attached to the under side of the purlins to stiffen the roof and serve as a point of attachment for the horizontal *short plate-rod*, 192.

**Plate-rod (freight cars).** 47, figs. 132-8. A horizontal metal rod which passes through two plates to tie them together. See also *Short plate-rods*, 192, figs. 93-6.

**Plate-washer.** Fig. 1873. Usually a wrought-iron *cut washer*, in distinction from a *cast washer*, but also used to designate many forms of large washers or plates serving as double or triple washers. See *Washer*.

**Plate-wheel.** Figs. 2124-78. A car-wheel of which the centre portion is formed of a disk or plate instead of



spokes. Varieties are the *single, double, open* and *combination* plate-wheel. See *Wheel and car-wheel*.

**Platform** (passenger and caboose cars). Fig. 686; 34, figs. 155-185, etc. A floor at the end of a car, supported by projecting timbers below the car-body to facilitate ingress and egress. On freight cars they are not common, except on cabooses, but narrow platforms are sometimes added for convenience of trainmen. See also *Miller, Janney* and *Cowell couplers*, which have certain special modifications of the platform, which have greatly added to its strength and security.

2. (Pile-driver car.) 27, figs. 1821-4. See *Swinging-platform*.

**Platform-car.** Figs. 13, 14, 15, 31, 32, 35 and 36. A *flat car*; which, if provided with sides, becomes a *gondola car*.

**Platform end-timber, or buffer-beam.** 38, figs. 155-85; 103, figs. 1843-6. A cross-timber at the outer end of a car platform.

**Platform-floor.** 34, figs. 155-85; 104, figs. 1843-4.

**Platform-gate.** 43, figs. 162, 164. A gate used to close the entrance to a platform, in general use only for private cars, suburban cars or street cars.

**Platform-hood.** 107, figs. 169-183; 115, figs. 1843-6. A cover or canopy attached to the end of a car-body, covering the platform. They are made of either wood or sheet-iron. When it consists of an extension of the main roof of a car it is called a *platform-roof*; but when it is a separate part, and fastened to the car-body, as is usually the case on street-cars, it is called a *platform-hood*. A *roof-apron* is a vertical finish of sheet-iron to either a platform-hood or platform-roof.

**Platform-hood bow.** 108, figs. 169, etc.; 116, figs. 1843-6. A bent wooden or iron bow which forms the outer edge of a platform-hood, to which the platform-hood carlines are fastened.

**Platform-hood carlines.** 117, fig. 1843. Transverse timbers which support the roof of a wooden platform-hood. Sometimes no carlines are used, as in fig. 186.

**Platform-hood ceiling.** 9, fig. 186. See *Platform-hood side-piece*.

**Platform-hood knee.** 118, figs. 1843, 1845. An L-shaped piece of wrought-iron by which a platform-hood is fastened to the car-body.

**Platform-hood moulding** (street cars). 119, figs. 1843,

1845. A small wooden moulding to cover the nails with which the roofing canvas is fastened around the edge. It corresponds with a roof-moulding.

**Platform-hood post.** 109, figs. 162-185. An upright iron bar or rod attached either to the platform or platform railing, to support a platform-hood. Now rarely used.

**Platform-hood side-piece.** 10, fig. 186. The end-piece to which the ceiling is attached.

**Platform-lever** (Janney coupler). 24, figs. 552, 555-601. (Janney-Miller coupler.) 69, figs. 554, 602-35. A lever corresponding to the Miller *uncoupling-lever*, actuating the *pull-rod* which operates the *catch-lever*.

**Platform-lever jaw** (Janney-Miller coupler). 58, figs. 554, 602-35. The fulcrum for the platform-lever.

**Platform-lever pin** (Janney coupler). 20, figs. 554, 555-601.

**Platform-plate, or buffer** (Cowell coupler). 1, fig. 538. A steel plate bent like the letter U, but with square angles, clasping the middle of the platform end-sill of the car. When in contact with the like plate of another car, it makes a continuous floor between them, 17 inches wide. Being pivoted at the platform end-sill, it adjusts itself to all curves of the road. The platform plate also acts as a *buffer*, and is sometimes so called.

**Platform-post.** 39, figs. 155-85, etc. See below.

**Platform-rail.** 41, figs. 155-85; 110, figs. 1843-6. A wrought-iron bar fastened to the tops of the *platform-posts*, forming a railing on the end of a car-platform. On steam cars an opening is left in the middle of the railing to allow persons to pass from one car to another. The railing is therefore made in two parts, and two platform rails are used. On street cars no such passage-way is left, and the rail is in one piece. The outside ends of the platform-rails of steam cars are usually carried down to the end-timber, so as to form the *outside post*. On street cars the outside end is attached to an ordinary post.

**Platform-railing.** An inclosure consisting of iron posts and rails on the end of a platform of a car to prevent persons from falling off. See above.

**Platform railing-chain.** 42, fig. 157. A chain connecting the two sections of the platform-rails of a passenger-car. Commonly used in service on the rear platform of the rear car only.

**Platform-roof.** 103, figs. 155-85. That portion of a car-

roof which projects over the platform. See *Platform-hood*.

**Platform-roof carline.** 104, figs. 155-85. See *Carline*.

**Platform-roof end-carline.** 105, figs. 155-85. See *Carline*.

**Platform short-sills.** 37, figs. 155-85. Short longitudinal pieces of timber, *not* extending under the car proper, which are framed into and bolted to the end-sills and platform end-timbers of a passenger or street car to sustain the floor of the platform. The longer timbers which extend under the body of the car proper are called *platform-sills*.

**Platform-sills.** 35, figs. 151-185; 101, figs. 1844-6. Pieces of timber attached to the bottom of a car-frame at each end outside of the draw-timber, and projecting beyond the end of the car to support the platform. They extend usually from the platform end-timbers to the bolster, or, in street cars, to one of the transverse floor-timbers. See above.

**Platform-steps.** 45, figs. 153-85; 114, figs. 1843-6. The stairs at each corner of a passenger car which afford the means of ingress and egress. A form of step has been recently introduced, but is not in general use, in which the lower step is *extensible*, being dropped down into position when the car is stationary and removed and elevated again by the motion of the train in getting under way. In modern passenger cars the platform-steps consist of usually three and sometimes four separate steps below the platform. The steps being of wood are often called *box-steps*. On street cars, one step only is used, and it is commonly made of plate-iron.

**Platform tie-rods.** 162, figs. 170-185; 51, figs. 636-40. Horizontal rods which pass through the *platform end-timber* and end-sill or body-bolster, for the purpose of holding them and the other portions of the frame of the car securely together.

**Platform-timber.** See *Platform-sill*.

**Platform-timber band** (street cars). 105, figs. 1843-6. A band made of plate-iron, which covers and embraces the outer end of a platform end-timber.

**Platform-timber, or platform-sill, clamp.** 36, figs. 156-85; 102, figs. 1843-6. A U-shaped iron clamp or bolt, with which a platform-sill is fastened to the end-sill of a car.

**Platform trap-door.** 1. 3, fig. 686. A door which

covers the space occupied by the steps, and thus extends the platform out to the side of the car. It is rarely used, except on officers' or other private cars.

2. Fig. 103. A door used in cabooses to serve the purpose of a water-closet.

3 (Janney-Miller coupler). 68, figs. 602-35. See *Trap*.

**Platform truss-beam** (Miller platform). 22, figs. 636-8. A short transverse piece of timber attached to the outer ends of the draw-timbers inside the platform end-timber, which forms the bearing of the *platform truss-rods*.

**Platform truss-rod** (Miller platform). 23, figs. 636-40. A rod fastened at one end to the body-holster or centre-sills, which then passes through or over the end-sill and from there downward to the platform truss-beam. Its use is to support the platform and prevent it from sagging.

**Play.** See *End-play*. *Lateral motion*.

**Plow.** See *Snow-plow*.

**Plug** (pipe-fittings). Fig. 1339. A short solid metal cylinder, with a screw on the outside and a square or hexagonal end to take hold of with a wrench, screwed into the end of a pipe or hole in a plate, to close the opening. See also *Basin plug*. *Four-way-cock plug*.

**Plumbago.** Graphite; one of the forms of pure carbon, from which pencils, etc., are manufactured. When pulverized, plumbago is an excellent lubricant, especially under heavy loads, and *plumbago oils*, prepared so as to hold the plumbago in permanent suspension, are among the most efficient of all lubricants.

**Plush.** "A species of shaggy cloth or stuff with a velvet nap on one side, composed regularly of a woof, of a single thread and a double warp; the one, wool of two threads twisted, the other of goat's or camel's hair. But some plushes are made wholly of worsted, others wholly of hair."—*Webster*. Plush is used in car-building chiefly as a covering for upholstered seats, for which it is almost invariably used.

**Pocket.** 1. (Sleeping cars.) 32, 33, figs. 678, etc. A receptacle for the clothing and small baggage of occupants of sleeping-berths. They are known as the *head board pocket* for the lower berth, and *upper-berth pocket*.

2. Any object having a cavity or opening which forms a receptacle to hold anything in its place. The main pockets of a car are the *body-post*, *corner-post* and



*right and left-hand body-brace pockets*, which are castings fastened to the upper side of the sill and the under side of the plate, to serve instead of mortises to receive the posts and braces. Brace-pockets are distinguished as *right* or *left-hand*, according to the inclination of their top to a person standing facing the car. *Double-brace pockets*, to receive two braces inclining in opposite directions, are also made, often with a receptacle in the middle for a post. A *post-pocket*, which see, is a casting on the *outside* of a car, like the *stake-pocket* of a flat or gondola car. Similar uses of the term are *leader-brace pocket*, *pilaster-pocket* and *mast-pocket*, for pile-driver and derrick-cars. See also *Drawbar-spring pocket*, *Draw-timber pocket*.

**Pop safety-valve.** A valve set with a spring so as to open suddenly with a wide opening at a fixed pressure; hence the name. For *Johnson heater*, see fig. 1472.

**Port.** See *Steam-port*. An opening in a valve for the passage of steam.

**Post** (of a truss). 12, fig. 2185; (for pile-driver car). 26, figs. 1821-4. A piece of timber or metal set upright and intended to support something else, as the *posts* of a house; the *posts* of a door; the *posts* of a gate; the *posts* of a fence; the *posts* of a bridge.

See <i>Body-post</i> .	<i>Lever-frame post</i> .
<i>Body queen-post</i> .	<i>Platform-hood post</i> .
<i>Brake-beam king-post</i> .	<i>Platform-post</i> .
<i>Corner-post</i> .	<i>Queen-post</i> .
<i>Deck-post</i> .	<i>Sub-post</i> .
<i>Door-post</i> .	<i>Truck-bolster king-post</i> .
<i>Hand-rail post</i> .	<i>Truck-frame king-post</i> .
<i>Hat-post</i> .	<i>Truck-frame queen-post</i> .
	<i>Window-post</i> .

**Postal car.** Figs. 57, 66-69. A car for carrying mail matter, and fitted up with boxes and other conveniences for assorting and distributing it. Nearly all mail matter is now assorted en route.

A distinction has been attempted between *mail cars*, used solely for carrying mails, and distributing *postal cars*, but the distinction is not well observed, and so-called mail cars, except as compartments in combination baggage cars on minor lines, are little used.

The railway post-office is an English invention, separate postal cars having been used as early as 1837. The present American postal car service was introduced by George B. Armstrong in 1864, and the first postal cars were run between Chicago and Clinton, Ia., and at about the same time between Washington and New York.

Postal cars are built and owned by the railway companies, but when in use are under the exclusive control of the post-office authorities. See also *Mail-van* (English).

**Postal-car chandelier.** Figs. 840-2. See *Chandelier*. A variety of postal-car lamps and chandeliers have been introduced with the object of giving a brilliant light when and as desired.

**Postal-car furnishings.** Figs. 1065, 1086.

**Postal-car lamp-chimneys.** Figs. 935-6. See *Lamp-chimneys*.

**Postal-car side-lamp.** Figs. 856, 862-3, 871. See *Postal-car chandelier*.

**Post-bracket** (Creamer brake, which see). 3, fig. 263.

**Post-office car.** Figs. 57, 66-9. See *Postal car*.

**Post-pocket.** An iron casting which is attached to the *outside* of the sill of a car to receive and hold a post in distinction from the *body-post pockets*, *corner-post pockets*, etc., of ordinary framing. Such pockets are more commonly used with stock cars and are very similar to stake-pockets. Shown on the side of the car in figs. 16-18, 29-32, 35-8. See *Pocket*.

**Post refrigerator car.** One of the class of cars using salt and ice for refrigeration. See *Refrigerator car*.

**Pot.** See *Fire-pot*.

**Potter drawbar.** Figs. 383-6, 451, 467. A drawbar made with a pair of ears on each side. To one pair of these a link is attached permanently, to the other pair a pin, so that it can be raised and lowered but not removed. To the centre an ordinary link can be coupled. The drawbar was named after the inventor. See *Drawbar*.

**Pouch-hook** (postal cars). Figs. 1072-4. Hooks used for suspending mail-bags while assorting the mails. They are usually strung loosely upon a rod, and are distinguished as *square-eye* or *round-eye*, according to the section of the rod. Some forms are permanently attached to the side of the car. See *Ormolu hook*, a term which should designate simply color and finish, but appears to be used to designate a difference of form.

**Press.** See *Seal-press*.

**Pressure-gauge.** 1. (Baker heater.) 30, figs. 1301, 1324. (Johnson heater.) Fig. 1472. An ordinary steam-gauge to show the pressure in the pipes. All heaters of this class have them.

2. (Pintsch gas-lighting apparatus). Fig. 826. A

gauge usually placed in the saloon. It registers atmospheres and not pounds, for convenience in computing the volume of gas in the tank.

**Pressure-regulator** (Pint-ch gas-lighting apparatus). J, fig. 812, and fig. 813. The valve by which the pressure of the compressed gas is reduced for consumption. The pressure regulator is one complete fixture, adjusted by the maker. Names of the principal interior parts are *diaphragm*, *diaphragm connecting-rod*, *diaphragm-lever*, *regulating-valve*, and *dust-arrester*.

**Pressure-retaining valve** (Westinghouse brake). Fig. 317. *Pressure-valve key*. *Pressure-valve seat*.

**Pressure-retaining valve** (Westinghouse freight brake). Fig. 317. A valve for use on long and steep gradients, provided with a weighted valve connected with the discharge port of the triple valve. It is controlled by a small handle, which, if turned in one direction, permits the air to escape freely, and, if in the other, forces it to pass under the weighted valve. In descending long gradients the weighted valve retains a pressure of ten lbs., which keeps the train under control when the brakes are released to recharge the reservoirs. On slight grades or a level the cock is turned to permit the air to escape freely without raising the valve. This valve does away with the necessity of using "straight-air" (which see) on such grades.

**Pressure tank** (Johnson heater). Fig. 1472. The receptacle in which the spare supply of fluid is kept, connected with the heater by a *heater-pipe*. The same part is called in the Baker heater the *circulating drum*, and in the Searle the *expansion drum*.

**Profile carline**. Figs. 646, etc. A carline, which see, extending from one plate to the other, bent to conform to the shape of the clear-story. They are, of necessity, always *compound-carlines*, which see, shown in section in fig. 647.

**Priming** (painting). The first coat in car-painting. Usually a pure thin oil put on hot, at about 150° F. or less. A thin *drier*, which see, of red lead or borate of manganese, is used with it. The next coat is the scraping filling-coat or *rough-stuff*, which see. See also *Painting*.

**Private car**. Figs. 211-3. Either an *officers' car* or *excursion car*, which see.

**Private lock** (English). 182, fig. 205. A door-lock universal in passenger service, which can only be operated

by a tapered rectangular hardened steel key, which is carried by all passenger trainmen, and most habitual travelers. One key will open any "private lock."

**Propelling-lever, or hand-car lever** (lever hand-car). 3, figs. 1724-6. The main lever to which power is applied.

**Propelling-lever brace-rods** (lever hand-car). 11, figs. 1724-3.

**Propelling-lever fulcrum** (lever hand-car). 6, figs. 1724-6.

**Protection-cap** (of wind-guard Harrison postal-car chandelier). B, figs. 841-2. This part complete is called also *lamp-jack*, 136, fig. 158.

**"Protection" cuspidor**. Figs. 810-11. One with a large mat. See *Cuspidor*.

**Pull**. "A catch or lip upon a drawer, door or window, by which it is pulled open."—*Knight*.

See *Door-pull*.

*Seat-pull*.

*Drawer-pull*.

*Sliding-door pull*.

*Deck-sash pull*.

*Window-blind pull*.

See, in engravings, *Furnishings*, *door*, *postal car* and *window*.

**Pulley**. "A wheel with a grooved, flat or slightly convex rim, adapted to receive a cord or band which runs over it. Its function is to transmit power or change the direction of motion."—*Knight*. A *sheave* is a pulley-wheel in a block, but *sheave* and *pulley* are used as almost synonymous terms. See *Sheave*.

See also *Bell-cord pulley*.

*Pile-hoisting sheave*.

*Berth-chain pulley*.

*Side-pulley*.

*Chain-pulley*.

*Window-curtain pulley*.

*Hammer-rope pulley*.

**Pull-hook, or deck-sash opener**. Fig. 1556. A shaft with a small hook on the top for opening deck-sashes. Also called *ventilator staff*.

**Pull-iron**. 206, figs. 95-7. A U-bolt passing through the side-sill for the purpose of attaching ropes in switching. A *push-block*, 191, fig. 97; 58, figs. 1-2-8, is an attachment to the lower corner-plate for the same purpose except that it is used for pushing instead of pulling the car.

**Pullman car**. Figs. 60-1, etc. A name strictly applicable only to cars run by the Pullman Palace Car Company, but in common usage not unfrequently applied to all classes of "palace" sleeping, parlor or drawing-room cars, as distinguished from day coaches; the Pullman cars having been the first of this class introduced on a



large scale and in modern style of finish, and being much more in use than any other class of parlor or palace cars. Included among Pullman cars are sleeping cars, parlor or drawing-room cars and dining-cars, which see. The latest pattern of sleeping cars are the *buffet* cars, which see. The latter differ from former designs, not only in the use of a "buffet," etc., but in being finished in much lighter colored woods than the former dark styles prevalent.

**Pullman passenger car trucks.** Figs. 1968-70. Several other and more recent styles of truck are now manufactured by the Pullman Palace Car Co., but drawings could not be obtained for this edition.

**"Pullman standard" car-seat.** Fig. 1137. A design for seat-ends introduced by the manufacturing department of the Pullman Palace Car Co. It is not used, however, in any cars operated by the Pullman Co.

**Pull-ring.** Figs. 1634-6. A metal ring with a screw attached by which it is fastened to any object, as a sash, drawer, etc., to take hold of in opening it. Chiefly used for *deck-sashes*.

**Pull-rod (Janney coupler.)** 10, figs. 542-554, 555-601. (Janney-Miller coupler.) 53, figs. 542-554, 555-601. The rod connecting the platform-lever with the catch-lever. See below.

3. (English brake-gear.) Any rod transmitting tension when the brake is applied.

**Pull-rod button (Janney coupler)** 34, figs. 542-554, 555-601. The "T" button upon the end of the *pull-rod*.

**Pull-rod plate (Janney coupler).** 33, figs. 555-601. A small chafing-plate on the Janney *platform knee-timber* through which the pull-rod passes.

**Pump.** 1. (Westinghouse brake.) Figs. 298-9. An *air-pump*, which see.

2. (Wash-rooms.) Figs. 1570-1. A *basin-pump*, which see.

**Pump drain-cock (Westinghouse brake.)** 19, fig. 311; fig. 294.

**Pump-governor (Westinghouse brake.)** Fig. 316. An attachment designed to automatically cut off the supply of steam to the pump when the air-pressure in the main reservoir exceeds a certain limit, usually about 70 lbs. The governor not only prevents the carrying of excessive air-pressure, but also causes the accumulation of a supply of air in the main reservoir while the brakes are

applied, which insures the release of the brakes, without delay. It also obviates the unnecessary working of the pump, when the desired air-pressure has been obtained.

The list of names of parts for fig. 316 is wrongly headed "Fig. 312."

**Pump regulator (Westinghouse brake.)** 17, figs. 311, 312.

The old design for the *pump governor*, which see.

**Punch.** See *Bell-punch*.

**Purlin.** 83, figs. 91-138; 205, figs. 97-101. A longitudinal piece of timber over the rafters, extending from one end of a car-roof to the other, to which the roof-boards are fastened. Sometimes called a *roof-strip*, but the latter more correctly applies to strips sometimes used above the purlins, as in figs. 670-5, etc.

**Push baggage-car.** Fig. 1713. A light *lorry-car* used at stations for moving baggage or freight from one train to another.

**Push-bar.** 1. ("American" steam driver-brake) 16, figs. 358-9; 23, figs. 363-4. The part in immediate connection with the brake-shoe by which the pressure is conveyed thereto.

2. (Westinghouse brake.) Figs. 343, etc. Also called *push-rod*. A compression bar which butts up against the piston of a brake-cylinder, being guided by a *piston-sleeve*, which see, figs. 330, etc., or some equivalent device, in such manner as to transmit the pressure on the piston when the air-brake is used, but to simply move away from the piston-rod, without moving the latter, when brakes are applied by hand. The engravings, figs. 338-48, are not quite clear and correct in representing this device.

**Push-bar cap ("American" horizontal-cylinder driver-brake).** 14, figs. 358-9.

**Push-bar pin ("American" horizontal-cylinder steam driver brake).** 18, figs. 358-9.

**Push-block.** 191, fig. 96; 206, figs. 97-101. A plate for inserting poles or bars in switching to enable the car to be moved from the side by an engine on a parallel track. It is usually a cavity cast upon the lower corner-plate, and not a separate attachment. *Pull-irons*, which see, serve the same purpose for the use of a rope.

**Push-car, or lorry car.** Fig. 1713. A four-wheeled car, also called *lorry-car*, used to carry materials and tools,

moved or pushed by hand. Also see *Ferry push-car*, fig. 72.

**Push-rod** (Westinghouse freight brake). Figs. 343, etc. See *Push-bar*.

**Push-rod** (Westinghouse freight brake-gear). 3, figs. 358-9; 343. The rod which butts against the brake-cylinder piston-rod and transmits its thrust. Generally, in brake-gear, any rod which transmits a thrust when the brake is applied.

**Push-rod hanger** (Westinghouse freight-brake). 1, figs. 338-40. A guide attached to the sills of the car to carry the outer extremity of the *push-rod*.

**Putty**. A mixture of linseed oil with whiting, which latter is chalk finely pulverized. Water is sometimes added in adulteration, causing the putty to stick to the fingers, and making it hard and brittle when dry. *Panel putty*, used for filling nail-holes in car work, is an extra quality made from whiting, white lead in oil, japan or varnish, and a small quantity of turpentine. The whiting is used merely to prevent the white lead from sticking to the fingers, and no more than necessary for this purpose is required. This putty forms a hard cement which does not shrink. When dry it can be rubbed down with pumice-stone or dusted with sand-paper. *Glycerine putty* is made of good thick glycerine and white lead or litharge. It hardens in 15 to 45 minutes, and stands water and acids.

## Q

**Quadrant**. A piece of metal curved in the form of the arc of a circle. See *Sector*. See also *Deck-sash quadrant*, fig. 1638. *Lever-quadrant* (Eames ejector). figs. 282-8.

**Quadruple-coil nest-spring**. Fig. 2062. A rarely used *spiral spring*, which see.

**Quadruplet** (of elliptic springs, which see). 80, figs. 1963-9, etc. Four springs side by side acting as one.

**Quarter-light, or side-light** (English). 137, figs. 204, 206. American equivalent, *window*. In a carriage, the window in the body as distinguished from the windows in the doors. The quarter-lights, in English practice, are always fixed, but on the continent of Europe they are invariably made to fall or open, and this is also the case

with the vehicles made in England and exported to warm climates.

**Quarter-light moulding, or glass-frame stile** (English). 142, fig. 205. The upright member of the fixed window framing. The glass is very generally fitted direct to the body, a strip of rubber being interposed, and the moulding screwed on outside, keeping the whole in position.

**Quarter-light panel** (English). 126, fig. 205. A panel on the outside of the body, placed above the window. Other exterior panels are *quarter-panel*, *waist-panel*, and *bottom side-panel*. Interior panels are the *partition panel*, *inside top-light panel* and *roof panels*.

**Quarter-light pillar** (English). 110, figs. 205-206. A part of the body framing of a carriage. A vertical post forming one side of the window aperture.

**Quartette** (elliptic spring). Also called *quadruplets*, which see.

**Queen Anne style**. Primarily a style of construction of furniture and buildings which became fashionable in England during Queen Anne's reign, in the early part of the 18th century. Its features are light and graceful framing, involving mostly straight lines, and an absence of applied ornament. Deep, rich tints are used in coloring. For examples of modern applications, see figs. 679, 827, 1194, etc.

**Queen-post** (of a truss). 6, fig. 2183. One of a pair of vertical posts against which the *truss-rod* bears. When one post only is used, it is called a *king-post*, which see. Such posts are used for the *body truss-rods* under car-bodies and occasionally trucks. See *Body queen-post*. *Inverted body queen-post*. *Truck-frame queen post*.

**Queen-post stay**. A, fig. 163. A bar attached to a queen-post to stay it laterally. See *Body queen-post stay*.

**Quintuplet** (of elliptic springs, which see). Five springs side by side, acting as one. Similar to 80, figs. 1963-5, or fig. 2033-4.

## R

**Rabbet**. "A rectangular groove made longitudinally along the edge of one piece to receive the edge of another. It is common in paneling, and in door-frames for the door to shut into."—*Knight*. *Rabbet* is a corruption of the word *rebate*.

**Rabbeted lock**. Fig. 994. "A kind of lock whose face-



plate is sunk within a rabbet cut in the edge of a door."  
—*Knight*. See *Lock*.

**Rabbit-piece** (for sliding foot-rest). Fig. 1194. A pair of castings with grooves (rabbets) in them.

**Race-horse box** (English). American equivalent, *horse car*. A four-wheeled covered vehicle adapted to run on passenger trains and to carry valuable and excitable horses. The mangers, stalls, etc., are carefully padded, and a compartment provided for the jockey, who can reach the horse's head. See also *Horse-box*.

**Rack**. 1. "A frame for receiving various articles."—*Webster*. See *Basket-rack*. *Bible-rack*. *Brush and comb rack*. *Card-rack*. *Head-board rack*. *Towel-rack*.

2. "In machinery, a rectilineal sliding-piece, with teeth cut on its edge for working with a wheel."—*Brande*. A *ratchet*, which see. See also *Beveled-rack*. *Sash-lock rack*. *Slewing-gear rack*.

3. (For geared car-seat, which see.) Fig. 1142.

4. (Wolfrath combination sash-lift and lock.) A, figs. 1700-2.

**Rack-catch** (for head-board). Fig. 1277. A small "cup-board catch" to hold the head-board pocket closed.

**Radial arms** (Thomas' steel-tired wheel). Fig. 2176. Projecting arms from the cast-iron wheel-centre forming the *cushioning-pockets* for the insertion of the wooden *cushioning-blocks* or *packing-blocks*.

**Radiator**. 1. (Baker and other steam and hot-water heaters.) Figs. 1300, 1326. A piece of iron pipe bent into a U-shape under the seats of a car, through which the hot water or steam circulates.

2. (Gouge beater.) 16, figs. 1405-7; 99, fig. 1411. The parts through which the air passes over the fire on its way to the *running-pipes*.

**Radiator-stand** (Baker and other heaters). Figs. 1331, 1336, 1340. A support for a *radiator*.

**Rafter**. Figs. 189, etc. A timber to support the roof of a car, which extends *part way* across the top, either from the plate to the ridge of the roof as (apparently) in the "A" car-roof, figs. 189, etc., or to the base of the deck-side only, as 101, figs. 155-5. When such timbers extend all the way across they are called *carlines*. See *Main-rafter*.

**Rail**. "The horizontal part in any piece of framing or paneling."—*Webster*.

See *Belt-rail*.  
*Bottom-rail*.  
*Deck Bottom-rail*.  
*Door case intermediate rail*.  
*Door-case top-rail*.  
*Door-rail*.  
*End-rail*.  
*Fender-rail*.  
*Top end-rail*.  
*Top side-rail*.  
*Upper belt-rail*.  
*Guide-rail*.

*Hand-rail*.  
*Lower seat-back rail*.  
*Middle door-rail*.  
*Panel-rail*.  
*Parting-rail*.  
*Platform-rail*.  
*Sash-rail*.  
*Seat-back rail*.  
*Seat-bottom rail*.  
*Seat-rail*.  
*Wainscot-rail*.  
*Window-blind rail*.

**Railing**. "A series of rails; a fence."—*Webster*. See *Platform-railing*. *Step railing* (street cars).

**Railing-chain**. 42, fig. 157. See *Platform railing-chain*.

**Railroad car**. See *Car*.

**Railroad-lantern**. Figs. 980-85. A lantern used in large numbers by trainmen and other employes of railroads. A variety of patterns exist, and are shown. A *conductor's lantern*, which see, is a special variety, but not so called.

**Raised-roof**. Figs. 155-85. An upper-deck or *clear-story*, which see.

**Ranges and cock-stoves**. Figs. 1430-3, also figs. 214, 193, etc. A *range* is a fixed and more elaborate cook-stove attached to the wall, and, in houses, usually built in with brick so as to need no stove-pipe to connect with the chimney.

**Raoul journal-box**. Fig. 2014. A journal-box with a V-shaped bar called the *yoke* or *bail* attached to the box so as to embrace and hold the lid, which latter carries an *end-stop* so as to dispense with a collar on the axle. See also note to engraving.

**Ratchet**. A serrated edge, sometimes straight and sometimes on a wheel, into which a pawl engages, for producing or (more commonly) restraining motion. See *Brake ratchet-wheel*. *Winding-shaft ratchet-wheel*. An *undulating ratchet* is one having no sharp edges, so that the ratchet catch will slide over them without removal on the application of force, as in Hart's deck-sash pivot, fig. 1624. Ratchets are sometimes made oblique or *beveled* so as to give the parts engaging with them a lateral tendency, as in the *Ormsty sash-balance*. Figs. 1705-7.

See *Bottom-ratchet*. *Uncoupling-lever ratchet*. See also *deck-sash pivot*, figs. 1618-24, for various forms

of ratchets and attached parts used in connection therewith.

In most of the English dictionaries the term ratchet is defined not only as the serrated edge, but also as the dog or pawl which engages therewith. This definition, however, is believed to be an error, which has been copied from one dictionary to another, and which does not correspond with practice in mechanical work, at least as respects American practice, which latter seems to confine the use of the term *ratchet* to the serrated edge only and does not designate the *pawl* also as a ratchet.

**Ratchet-burner** (for kerosene oil). Fig. 913. One in which the wick is moved up and down by a pointed wheel engaging in it, like mineral oil burners.

**Ratchet-wheel**. See *Brake ratchet-wheel*. *Winding-shaft ratchet-wheel*.

**Rattan car-seat**. Fig. 1130½. See *Car-seat*.

**Rattan-seating** (canvas lined). Fig. 1218. See *Canvas-lined*.

**Rave**. Fig. 1708, 1718. 15, figs. 1720-3. A vertical side-piece to the frame of a wagon-body or other vehicle. The term is applied to such parts on hand-cars (the raves being also called *seat-risers*), but not to other railroad cars, although literally applicable, for instance, to the sides of a gondola car.

**Reach**. Figs. 1780-1812. See *Extension-reach*.

**Rear foot-rest** (Harley reclining-chair). Figs. 157-8. A foot-rest for the benefit of the occupant of the chair in the rear. See *Foot-rest*.

**Rebate**. "In architecture, a groove or channel sunk on the edge of a piece of timber."—*Webster*. Usually written *rabbet*, which see.

**Receiving-valves** (*upper and lower*), (air-pump for Westinghouse brake). 31 and 33, figs. 298-9. Puppet valves, which see, at the top and bottom of the air-pump cylinder, to admit the air.

**Recipient** (Pintsch gas-lighting apparatus). H, fig. 812. Two large tanks, one under each side of the car, in which the compressed gas is stored and discharged thence into the *pressure-regulator*. See below.

**Recipient filling-valve** (Pintsch gas-lighting apparatus). A, fig. 812, and separately in figs. 813-19. A valve of peculiar construction for the admission of the compressed gas to the recipient, so that it can be transmitted through the same valve to the regulator for consumption.

**Recipient valve** (Pintsch gas-lighting apparatus). B, fig. 812; fig. 817. The cock attached to the recipient to connect it with the filling-valve or the regulator, as desired.

**Recording-bell** (street cars). A bell attached to a bell-punch or other instrument on which the conductor records the fares collected, to indicate that fact to the passengers.

**Reducer** (pipe fittings, which see). Figs. 1344, etc. A means of decreasing the diameter of the pipe used. They are either *bushings*, *couplings* or T's, which see.

**Reducing collar** (for lamp). Fig. 909. See *Collar*.

**Reducing pipe-coupling**. Figs. 1344, etc. See *Reducer*.

**Reducing tee or T** (pipe fittings, which see). Fig. 1333. See also *Reducer* and T.

**Reducing-valve** (Westinghouse train signal apparatus). Fig. 691. A valve for reducing the pressure of air admitted to the train signal pipes below that maintained in the brake pipes and main reservoir. In the train signal apparatus a very low pressure, not usually exceeding two atmospheres, is used.

**Reflector**. 1. (Lamps.) 14, figs. 828-33. "A polished surface for reflecting light."—*Webster*. See also *Alcove-lamp Reflector*, 25, figs. 855, 864. *Lamp-chimney Reflector*, 15, figs. 843, 857.

2: (Lanterns.) Figs. 933-4. *Reflector and chimney-holder combined* (for lamp), figs. 866, 933.

**Refrigerator** (of a refrigerator car). A, figs. 131, etc. The chamber, constituting the main body of the car, in which the paying load is placed.

**Refrigerator car**. Figs. 11-12, 126-131½. A car for carrying perishable articles, especially meat, constructed with compartments in which ice is carried, and with double floor, sides and roof, to keep the ice from melting. A great variety of types have been designed, but they can all be reduced to four general classes, viz.: Those which use ice and salt, or ice only, for refrigerating, and those which carry ice overhead in *ice-pans* or in the ends of the cars in *ice-racks* or *tubes*. The most important difference of all in refrigerator cars, the difference in the character of the circulation and dryness of air, is not touched by this classification, nor can it be gone into. The temperature aimed at is about 40° F., or 8° above freezing. Many of the older cars were mere air-tight boxes, without any circulation.



whatever, with the effect that an unnecessarily low temperature was required in one part of the car to keep all cool enough. The principal difference in the external appearance of refrigerator cars, as will be seen in fig. 12, is their greater height and width. Refrigerator-cars using salt use from 1 to 2 bushels for each 100 lbs. of ice.

The following is a practically complete list of the various refrigerator cars, which are somewhat more fully described under the name of each. All cars, unless otherwise noted, use ice only, without salt:

- Allegretti*.—Roof ice-box; good circulation.  
*Anderson*.—Ice-box in end; poor circulation.  
*Arctic*.—(Empire Line).—Ice-troughs along side of the car near roof. Takes full cakes of ice; good circulation.  
*Auer*.—Fig. 126-9. Ice-box in end; rubber insulation.  
*Birdsall*.—Iron ice-trough in an upper deck for the full length of car.  
*Chase*.—Ice-box in end.  
*Davis*.—Ice and salt; ice-box in roof; no circulation.  
*Davis Improved*.—Ice-box in end; fair circulation.  
*Ely, Cloud & Wall*.—Figs. 131, 131½. Roof ice-boxes; circulation made a special point.  
*Fisher*, or "*Diamond R.*"—Ice-box in roof in upper deck; patent owned by the Pennsylvania Railroad Co.  
*Hamilton*.—Ice and salt; vertical ice-flues.  
*Higgs*.—Ice-box in end of car, supplied from the roof.  
*Lorenz*.—Figs 130-130½. Ice and salt.  
*Post*.—Salt and crushed ice; circular ice-boxes at each end 16 in. in diameter. The drip utilized for refrigerating.  
*Ridgway*.—Ice boxes in end; separate chamber for the circulation of air.  
*Tiffany*.—Fig. 130a. Roof ice-pan; elaborate insulation.  
*Wicks*.—Ice and salt.  
*Zimmermann*.—Ice-box in roof whole length of car; uses broken ice; no circulation.  
*Zimmermann Improved*.—Ice and salt; ice-boxes in end pierced with a number of flues.

**Register.** An aperture for the passage of air, provided with suitable valves, doors and sliding or revolving plates, by which the aperture is opened or closed. See *Feed-door register*, figs. 1362-5. *Frieze-ventilator register*, fig. 1553. *Ventilating register*, fig. 1272. (For Winslow heater.) In the Winslow and other hot-air heaters, fig. 1533, registers are placed at or near each seat.

**Register-face.** 4, fig. 1553. A grating with which the opening of a register is covered. It is usually of some ornamental pattern.

**Register-frame.** 2, fig. 1553. See *Register*.

**Register-handle** (for a register-valve). 1, fig. 1553.

**Register-valve.** 3, fig. 1553. See *Register*.

**Regulating.** An unusual term for *switching*, or the act of moving cars from one track to another in making up or separating trains. Also called *drilling*, or in England *marshaling*, or, less correctly, *shunting*.

**Regulating-nut, spring, etc.** (Westinghouse pump governor). 15, fig. 316.

**Regulating-valve** (Pintsch gas pressure-regulator). Fig. 813. See *Pressure-regulator*.

**Regulator.** See *Heat and draft regulator*, figs. 1491-2. *Pressure-regulator*, figs. 812-3.

**Release-bracket** (Am'n aut. compression brake, which see). 21, figs 368-9. A bracket fixed to the timbers of the car to which one end of the *release-chain* is attached by the *release-nut* and *eye-bolt*.

**Release-chain.** 18, figs. 368-9. See above.

**Release-chain eye-bolt.** 19, figs. 368-9. See above.

**Release-cock** (Westinghouse brake). Fig. 326; 24, fig. 311. Also popularly called *bleeding-valve*. A cock attached to the brake-cylinders for permitting the compressed air to escape therefrom, when the locomotive is detached or when the apparatus is out of order, so as to release or "bleed" the brakes.

**Release-lever** (Westinghouse brake). A bent lever, now no longer used, to which an exterior *release-spring*, which see, was attached for drawing the brake-beams away from the wheels when the air pressure was released. The release-spring is now placed within the cylinder, as in figs. 329-31.

**Release-nut** (American automatic compression brake). 20, figs. 368-9. See *Release-bracket*.

**Release-spring.** 1. (Passenger car trucks.) 91, figs. 1943-69. A spring attached to the *end-piece* of a truck for the purpose of throwing the brakes out of contact with the wheels. The name is also applied to any spring used to throw the brakes off from the wheels.

2. (Westinghouse car-brake.) 12, figs. 329-31. A spiral spring which acts so as to move the brake-piston inward and thus release the brakes from the wheels after the compressed air is allowed to escape from the cylinders. It was formerly carried outside the brake-cylinder by a *release-spring bracket*, etc., but is now placed inside the cylinder.

**Release-valve** (Westinghouse pump governor, which see). 13, fig. 316.

**Reservoir.** 1. (Westinghouse brake apparatus.) The *main reservoir*, figs. 300, etc., goes under the foot-board of the locomotive, and the *auxiliary reservoir*, figs. 301-2, etc., under the tender and each car. In the latest and most approved designs the driver brake also is operated from

a separate triple-valve and auxiliary reservoir placed on the engine. In the Westinghouse freight-brake, figs. 338-9, etc., the auxiliary reservoir is constructed in one piece with the triple-valve and brake-cylinder.

2. Or *Lamp-body* (Moehring argand lamp). **A**, figs. 849-50. See also *Lamp-reservoir*, or *lamp-fount*.

3. (Pintsch gas-lighting apparatus.) More properly, recipient. **H**, fig. 812, which see.

4. (Student lamp.) **A** (or 6), figs. 852-4. The removable cylinder carried within the shell called the *outside cylinder*.

**Reservoir drain-cock** (Westinghouse brake). **24**, fig. 311 ; fig. 326. A cock for emptying the reservoir of any water condensed from the air. Formerly also used as a *release-cock*, or *cylinder release-cock*, which see, for letting off or "bleeding" the brake.

**Reservoir drip-chamber** (student lamp). **C**, fig. 852-854. A cavity in the outside cylinder below the reservoir. Used only in the best lamps.

**Reservoir journal-box**. Fig. 2010. See *Top-reservoir journal-box*.

**Reservoir pipe** (for Westinghouse brake). Also called *discharge pipe*. **9**, figs. 295-7. The pipe conveying the air from the air-pump to the reservoir.

**Rest**. That which supports something or on which it rests.

See <i>Arm-rest</i> .	<i>Side-rest</i> (tip car).
<i>Berth-rest</i> .	<i>Stake-rest</i> .
<i>Foot-rest</i> .	<i>Upper berth-rest</i> .
<i>Grate-rest</i> .	<i>Window-blind rest</i> .
<i>Side foot-rest</i> .	<i>Window-sash rest</i> (street cars).

**Restaurant car**. Figs. 56, etc. More properly *dining car*, which see.

**Retaining-lip** (Atwood hemp-packed wheel, which see). Figs. 2166-8. A ring very similar in principle to a *retaining-ring*, which see, turned upon the inside of the *wheel-centre flange*.

**Retaining-ring** (for wheel tires). Figs. 2156, 2157, 2158, 2162-65, 2166-68, 2177-78. A ring securing the tire to the wheel. See *Mansell retaining-ring*, and *tire-fastening*.

**Return-bend** (pipe-fittings). Figs. 1337-41. A short cast-iron U-shaped tube for uniting the ends of two wrought-iron pipes. They are called *close return-bends*, or *open return-bends*, according as the section of the pipe is kept a distinct circle at all points. The close return-bend has

simply a partition dividing the two parts for a short distance.

**Return-tag**. Fig. 1114. A tag attached to cars, usually by slipping it on to the shackle of the seal and used as an evidence of the due arrival of the car or as a direction to what point the car itself is to be returned.

**Reversible car-seat**. Fig. 1139. A name sometimes applied to the common form of car-seat in which the back only reverses, but more properly applied to such a seat as the *Buntin reversible car-seat*, which see, in which the seat is moved and not the seat-back only, what was the seat becoming the seat-back, and *vice versa*.

**Reversible lantern**. Figs. 972-3. See *Burrell's reversible signal lantern*.

**Reversible street car**. Fig. 1842. A street car with a running-gear on which the body can be turned, or reversed, at the end of its route. Little used. See *Street-car*.

**Reversing-cylinder** (engine for Westinghouse brake). **22**, fig. 298 ; **19**, fig. 299. A small hollow metal cylinder in the steam cylinder-head in which the *reversing-piston*, which see, works.

**Reversing-cylinder cap** (engine for Westinghouse brake). **21**, fig. 299, etc. A metal screw-plug screwed into the recess which receives the reversing-cylinder and holds the latter in its place.

**Reversing-piston** (engine for Westinghouse brake). **23**, fig. 298 ; **20**, fig. 299. A small piston placed above the steam-valves and which moves the latter downward. The excess of steam-pressure on the under side of the upper steam-valve, owing to its being larger than the lower one, moves them upward when the pressure on the reversing-piston is released by the movement of the *reversing-valve*, at the top of the stroke of the main steam piston, which then strikes the *reversing-valve stem*, which see.

**Reversing-piston packing-ring** (Westinghouse brake). **9**, fig. 298 ; **16**, fig. 299. See *Piston*.

**Reversing-valve** (engine of Westinghouse brake). **16**, fig. 298. A slide-valve working in a small cylinder in the steam-cylinder head, and thus controlling the admission and exhaust of steam to and from the *reversing-piston*. See *Reversing-valve stem*.

**Reversing-valve bush**, or *bushing* (engine of Westinghouse brake). **19**, fig. 298 ; **23**, fig. 299. See *Bushing*.



**Reversing-valve cap**, or chamber-cap (engine of Westinghouse brake). 20, fig. 298; 24, fig. 299. A screw-plug which holds the *reversing-valve bushing* in its place.

**Reversing-valve plate** (engine of Westinghouse brake). 18, fig. 298; 10, fig. 299.

**Reversing-valve stem** (engine of Westinghouse brake) 17, fig. 298; 10, fig. 299. A rod attached at the upper end to the reversing-valve. It extends downward into a hole bored into the piston-rod, and is moved by the piston at each end of its stroke. The admission and exhaust of steam above the reversing piston is changed at each end of the stroke of the main steam piston, and by this means the main-valves are shifted and made to admit steam, alternately, above and below the steam-piston.

**Revolving-chair**. Figs. 1159-66. See *Parlor-car chair*. *Hartley chair*. *Horton chair*.

**Revolving lamp-disk** (Harrison postal-car chandelier, which see). D, figs. 841-2

**Rib** (of a cast-iron wheel). A *bracket*. See *Wheel-rib*. *Car-wheel*.

**"Richmond" spring burner**. Fig. 882. See *Lamp-burner*.

**Ridge**. See *Roof-ridge*.

**Ridge-clamp**. 3, fig. 663. The grooved stick on top of the boarding of a pitched roof directly over the ridge-pole. In the Winslow car-roof, figs. 670-5, they are called simply *roof strips*, which see.

**Ridge-pole**. 84, figs. 89-138, etc. A longitudinal timber in the centre of a roof, supported by the carlines or rafters on which the roof-boards rest. In some cases the rafters are framed into the ridge-pole, and in some cases, as figs. 667-8, the ridge-pole is grooved to receive the roof-sheets.

**Ridgway refrigerator car**. One of the class of cars having ice-boxes at the end of the car, with the addition of a chamber for the circulation of air, so that it may not depend wholly on its circulation through ice for its low temperature. The drainage water flows down from the box through a series of V-shaped troughs backward and forward until its cooling properties have become exhausted. The condensation on the lower side of these troughs drips into the trough below, the lowest trough of all being of wood. Full-sized cakes of ice are used, and the ice-box is exposed on all sides to the car.

**Right and left of a seat** is as for a person sitting in a seat; of a stove or of the end of a car is as for a person facing it; of a brace is one which leans to the right or left of a person standing facing the side of the car.

**Right and left screw**. A pair of screw-threads cut turning in opposite directions, so that a common nut or pipe-coupling tapped with similar threads will, according to the direction in which it is turned, draw the two rods nearer together or press them farther apart.

**Right-and-left-screw turnbuckle**. Fig. 1582. See *Turnbuckle*. Other forms are *swivel turnbuckle*, fig. 1881, and *tube turnbuckle*, fig. 1883.

**Right-hand brace-pocket**. 40, figs. 132-6. See *Right and left*.

**Right-hand seat** (of car-seats with a stationary back). Figs. 1134-5, etc. See *Right and left*.

**Right-hand seat-end**. See above.

**Rigid-bolster truck**. Figs. 1907-11, etc. A car-truck with a bolster which has no lateral or swing motion, which see. See also *Bolster* and *truck-bolster*.

**Rigid caster** (for tables). Fig. 1545. See *Caster*. A "rigid caster" is a mere socket and not properly a caster at all, except from being used in the same manner as a finish for legs of tables and chairs.

**Rim**. 1. (Of a car-wheel.) 23, fig. 2002, etc. That portion of a car-wheel outside of the *plate*. The *face* of the rim is the outside vertical edge or face.

2. (Of a wrought-iron wheel.) 28, fig. 116. The wrought-iron ring which is welded to the outer ends of the spokes and surrounded by the tire.

**Rim-latch**. Figs. 988-95, 1005-10, 1022-4, 1026. A latch which is attached to the outside of a door and is not let into it.

**Rim-lock**. Figs. 992, 1006-9. "A lock having an exterior metallic case which projects from the face of the door, differing thus from a mortise lock."—*Knight*.

**Ring**. 1. See

*Casing-ring.*

*Grate-ring.*

*Helper-ring.*

*Inside-ring.*

*Lamp-ring.*

*Mansell retaining-ring.*

*Man-hole ring.*

*Packing-ring.*

*Pull-ring.*

*Rubber-packing ring.*

*Slewing-ring.*

*Stove-pipe ring.*

*Top-ring.*

*Ventilator-ring.*

*Window-curtain ring.*

2. (Baker heater.) 18, fig. 1301; fig. 1319. A cast-

iron ring attached to the *smoke-top* to stiffen it, and hold the feed-door.

**Riser.** See *Step-riser*. *Seat-riser*.

**Rivet.** "A pin of iron or other metal with a head drawn through a piece of timber or metal, and the point bent or spread and beat down fast to prevent it being drawn out, or a pin or bolt clinched at both ends."—*Webster*. See *Coupling-link rivet*. The *seat-arm pivot*, which see, figs. 1167, &c., is usually in the trade termed a rivet, but incorrectly.

**Rivet-fastening** (English). Fig. 2152. As applied to railroad wheels, the oldest and most defective mode of securing the tire to the wheel. It is fast becoming obsolete and is only used on the cheapest kind of coal cars. See *Tire-fastening*.

**Rivet-seal.** Figs. 1117-9. A seal with a lead rivet which is closed by a die. See *Car-seal*.

**Rocker.** 1. (Geared car-seat, which see.) Fig. 1142. The end-piece rocking on a central pivot and moved by the *rocker-arm* in such manner that the reversing of the back changes the inclination of the seat. See also *Mason rocker car-seat*, figs. 1123-3, which accomplishes the same end differently.

2. (Tip-car). 155, fig. 143. A crescent-shaped casting bolted to the *rocker-timbers* of the car-body on which the body rests, and rolls when the body is tipped.

**Rocker-bearing** (tip-car). 156, fig. 143. The iron cap for the rocker-bearing *timber* to support the rocker.

**Rocker-bearing timber** (tip-car). 157, fig. 143. A horizontal timber at the end of the car on which the *rocker-bearing* rests.

**Rocker-bearing-timber hangers** (tip-car). 158, fig. 143. Vertical timbers or iron bars framed and bolted to the *end-piece*, to which the rocker-bearing timbers are fastened.

**Rocker car-seat.** Figs. 1123-23. A seat having the bottom adjustable so as to give it an inclination towards the seat-back in all cases, on whichever side the seat-back may be placed. See *Rocker* and *car-seat*.

**Rocker side-bearing.** Fig. 2030. See *Side-bearing*.

**Rocker-timbers** (tip-car). 159, fig. 143. See *Rocker*.

**Rocking-bar** (grate of Baker heater). 16, fig. 1301; fig. 1317. A horizontal bar which supports the grate, and on which the latter is attached by a pivot in the centre

so that it can be turned horizontally and thus shake the fire. A vertical movement is often used instead.

**Rock-lever** (Cowell platform and coupler). 2, fig. 533. An equalizing-bar, with a knuckle-joint in the middle of the rear, which rests on the end of the *slide-pin* 3, and allows free horizontal motion to its two arms. Upon the ends of the latter in front rest the rear ends of the *buffer-springs* 14. The object of the rock-lever is to equalize the pressure of the springs on the inside of the *platform-plate* (1) when passing curves.

**Rock-plank.** A *truss-plank*, which see.

**Rock-shaft arm** (Hartley chair, which see). 8, figs. 1154-8.

**Rod.** In car-building this term generally means a slender bar of iron with a nut on each end, in distinction from a bolt which has a head on one end and a nut on the other. Very long bolts, however, are often called rods. Rods in general take their name from the parts with which they are connected or the use which they serve. Among the rods used in car framing are:

<i>Body-bolster truss-rod.</i>	<i>Draw-rod.</i>
<i>Body brace-rod (centre and end).</i>	<i>End-girth tie-rod.</i>
<i>Body counterbrace-rod.</i>	<i>Girth tie-rod.</i>
<i>Body truss-rod.</i>	<i>Inverted body-truss-rod.</i>
<i>Bruce straining-rod.</i>	<i>Plate-rod.</i>
<i>Centre draw-rod.</i>	<i>Platform tie-rod.</i>
<i>Cross-frame, or needle-beam truss-rod.</i>	<i>Platform truss-rod.</i>
	<i>Sill-and-plate rod.</i>
	<i>Sill tie-rod.</i>

Among the rods connected with brake-gear are:

<i>Brake beam truss-rod.</i>	<i>Floating connecting-rod.</i>
<i>Brake-block tie-rod.</i>	<i>Long brake-rod.</i>
<i>Brake-shaft connecting-rod.</i>	<i>Lower brake rod.</i>
<i>Cylinder-lever tie-rod.</i>	<i>Release-lever rod.</i>
	<i>Secondary brake-rod.</i>

Among the rods in trucks are:

<i>Pedestal stay-rod.</i>	<i>Truck-bolster truss-rod.</i>
<i>Safety-beam tie-rod.</i>	<i>Wheel-piece tie-rod.</i>
<i>Safety-beam truss-rod.</i>	<i>Wheel-piece truss-rod.</i>
<i>Transom truss-rod.</i>	

Among rods for interior fittings of cars are:

<i>Basket-rack rod.</i>	<i>Window-curtain rod.</i>
<i>Berth-curtain rod.</i>	<i>Window-shade rod.</i>
<i>Gruin-door rod.</i>	



See also

<i>Candle-rod.</i>	<i>Piston-rod.</i>
<i>Hand-car truss-rod.</i>	<i>Tank-valve rod, etc.</i>
<i>Lever-frame truss-rod.</i>	

**Rod-hanger** (bell-cord). Figs. 735, 740-1. See *Bell-cord hanger*.

**Roll** (of upholstery). Fig. 1225. See *Felt-edge*.

**Rolled-axle**. An axle made of rolled iron. See *Axle, Car-axle*.

**Roller**. 1. "That which rolls; that which turns on its own axis, particularly a cylinder of wood, stone, metal, e.c."—*Webster*.

See <i>Adjustable roller car-seat.</i>	<i>Side-bearing roller.</i>
<i>Friction-roller.</i>	<i>Sliding-door friction-roller.</i>

2. (Window-shades.) The cylinder on which the shade is rolled up, containing within it the springs which actuate. See *Hartshorn and McKay shade-roller*.

2. (Of pile-driver car.) 19, figs. 1821-4. The small wheels under the *swinging-platform* rolling upon the track attached to the floor of the car.

**Roller bearings** (for window-shade). 5, fig. 1633. See *Hartshorn and McKay shade-roller*.

**Roller car-seat**. Figs. 1140-41. See *Adjustable roller car-seat*.

**Roller side-bearing**. Fig. 2028. A side-bearing, with one or more rollers on which the car-body rests. See *Side-bearing*.

**Roof**. Figs. 664-75, etc. "The cover or upper part of a house or other building, consisting of rafters covered with boards, shingles, or tiles, with a side or sides sloping from the ridge for the purpose of carrying off the water that falls in rain or snow."—*Webster*. The roof of passenger cars is in two parts, commonly called the *upper* and *lower deck*, which see. See *Car-roof*.

Also <i>Arched-roof.</i>	<i>Platform-roof.</i>
<i>"A" car-roof.</i>	<i>Pitching-roof.</i>
<i>Corrugated metal car-roof.</i>	<i>Single-board roof.</i>
<i>Double-board roof.</i>	<i>Winslow-roof.</i>
	<i>"X" roof.</i>

**Roof-apron**. 106, fig. 155. A vertical or inclined metal or wooden screen attached to the end of a passenger-car roof to prevent cinders, rain, or snow from being driven on to the platform and into the door-way.

**Roof ascending-rail** (English). 176, figs. 205-7. See *Ascending-rail*.

**Roof-boards**. 1. 86, figs. 88-92, 132-8; 102, figs. 155-85; 55, figs. 1843-4. The boards which form a covering of a roof. They run longitudinally on passenger cars and usually transversely on freight cars. See *Car-roof*.

2. (English.) 131, figs. 204-5. The planking forming the roof. It invariably runs longitudinally.

**Roof-brace**. 1. (Freight car-roofs.) 85, figs. 133, 137. Diagonal strips of wood or iron attached to the top of the rafters or carlines under the roof-covering to stiffen the roof.

2. (Of a centre lamp or chandelier). 32, figs. 827½-71. Diagonal stays passing from the lamp to the roof. Vertical supporting stays are known as *lamp-arms*, with or without a large *centre-stay*.

**Roof-brace hub** (Harrison postal-car chandelier). G, figs. 841-2. A hub on the centre-stay to which the roof-braces are attached.

**Roof commode-handle** (English). 176, figs. 205-7. See *Ascending rail*.

**Roof corner-casting** (passenger cars). A cast-iron moulding for the corners of platform-roofs. They are made rights and lefts, and are specified as for a person standing and facing the end of the car.

**Roof cover-strip** (single-board roofs). 1, fig. 665. A metallic U-shaped strip used to cover the joints of the roof-sheets. See *Roof-strip*.

**Roof grab-iron** (box and stock cars). 9, figs. 252-4, 656-7. An iron bar fastened to the roof to be grasped when ascending the ladder at the end of the car. Also called *ladder-hand e*. See *Grab-iron*.

**Roof hand-rail**. 3, figs. 252-4. A hand-rail usually made of gas-pipe in front of the brake-wheel, designed to protect the brakeman when applying the brakes. It is stiffened by a *hand-rail brace*, 4, figs. 252-4. The whole arrangement shown in these figures is designed to take the place of the *brake-step*, which has been disapproved of by vote of the M. C. B. Association. See *Brake-step*.

**Roofing-canvas**. A heavy duck for covering the outside of the roofs of cars, chiefly used on street cars.

In England it is universally used for all cars with roofs. It is hedded on fresh thick white lead or *smudge* (which see), and then receives several coats of the same paint.

**Roofing-duck**. The trade name for the cloth used for

head linings, manufactured in any width up to 12 ft. It is lighter than roofing canvas.

**Roof-lamp** (English). 160 to 168, figs. 204, 205. A lamp used to illuminate the inside of a carriage or other covered vehicle. A circular hole, about 8 in. diameter, is cut through the roof, and the roof lamp placed in this aperture from the outside, the glass and burner when in position being a little below the inner surface of the roof, and entirely inaccessible from within. This form of lamp is wasteful of oil, yields a dim and uncertain light, is costly to handle and the glass is constantly broken. It is therefore being superseded in Germany and England by Pintsch's and similar methods of using compressed oil-gas.

See <i>Lamp-case.</i>	<i>Lamp-burner.</i>
<i>Lamp-cover.</i>	<i>Lamp-glass.</i>
<i>Lamp-plug.</i>	<i>Lamp-case base.</i>
<i>Lamp plug stand.</i>	<i>Inner lamp-ring.</i>
<i>Lamp-cover spring-catch.</i>	

**Roof-lever** (Creamer brake, which see). 9, fig. 265.

**Roof-light.** A *deck-sash*, which see. See also *End roof-light* (street cars).

**Roof-panel** (end). 11, fig. 186. The panel over the door of passenger cars.

**Roof-piece** (Gouge heater). 100, figs. 1421, etc. A sheet-iron plate fitted to the roof through which the *injector* and *smoke-pipe* pass.

**Roof-ridge** (freight cars). The intersection of the two plane surfaces forming a pitching-roof.

**Roof running-board.** 87, figs. 82-133. See *Running-board*.

**Roof running-board bracket.** 89, figs. 87-96. See *Running-board bracket*.

**Roof running-board extension.** 83, figs. 87-91. See *Running-board extension*.

**Roof-sheets.** 1, fig. 669; 2, fig. 665; E, figs. 667-8. Metallic sheets, sometimes corrugated and sometimes not, for covering freight-car roofs. Their joints are sometimes closed by a *roof cover-strip*, and sometimes the edges fit into grooves in wooden carlines or *joint-strips*. See *Car-roof*.

**Roof-step** (freight-car roofs). Figs. 656-7; 92, figs. 82-6. A horizontal board, which extends sidewise from the running-board to near the side of the car above the ladder, its object being to give a secure foothold and protect the roof from wear.

**Roof-stick, or hoop-stick** (English). 120, fig. 205. American equivalent, *carline*. A piece of timber which supports the planking of the roof, and is either bent or cut to the curve of the roof.

**Roof-strap** (street cars). See *Diagonal roof strap*.

**Roof-strips.** 1. Used quite frequently but somewhat confusingly to designate a *purlin*, which see.

2. (Passenger cars.) 14 and 17, fig. 186. Narrow wooden strips attached as stiffeners to the under side of the carlines of the lower deck.

3. (Winslow and other car-roofs.) Figs. 670-5. A longitudinal wooden strip on top of the metal roof-sheets to which the roof-boards are attached. The central roof-strip is called in other roofs a *ridge-clamp*. Sometimes at the ridge a single *ridge-clamp* is used, as 3, fig. 679.

**Roof-ventilator.** Figs. 1567, etc. See *Ventilator*.

**Rope.** "A large string or line composed of several strands twisted together."—*Webster*. See *Berth safety-rope*. *Berth-spring rope*.

**Rose.** Figs. 1002, etc. See *Door-latch rose*.

**Ross flange brake-shoe.** Figs. 247-8. A brake-shoe with a hollow in the middle where most of the rolling-wear comes, and with a lip projecting over the flange. It is mainly designed for use on engines. The brake-shoe is held in position laterally by the outside and inside *flange-lips*, C and E, fig. 247. The two side portions having a bearing upon the wheel are termed the flange and tread *bearing-blocks*.

**Rotary snow shovel.** See *Snow-shovel*.

**Rough-stuff, or scraping filling-coat** (painting). The next coat after the *priming*, which see. Its purpose is not to protect but to level the surface of the wood. Therefore, none of it is left on the higher portions of the surface, but used merely to fill the hollows to a level with these. The surface is scraped to an even plane, level with the highest level of the bare wood. After 24 hours to dry, a second coat is put on, scraped down to the level of the highest portions of the bare wood. After a second 24 hours to dry, the car is sand papered and is ready for the *color-coats*, which see. See also *Painting*. A common material for this coat is 6 lbs. keg white lead, 7 lbs. whiting, mixed thick with coat-japan and ground in a paint-mill. This mixture is thinned with turpentine, so as to be thin enough to work easily, and so thick as not



- to run. It is put on with a leveler or scraper, often made of an old saw blade.
- Round-bar spiral-spring.** E, F, figs. 1003-4, 1010. A spiral spring made of one or more round bars of metal. See *Spiral spring*. This form is the most common of all and the most efficient in theory for a given weight of metal.
- Round-cornered car.** Figs. 187-190, 1529-30. A method of finishing the ends of passenger cars by omitting the corner-posts and rounding them off to a very large radius. It is quite exceptional.
- Round-corner seat.** 174, figs. 187-90. A corner seat for a round-cornered car.
- Round coupling-pin.** Fig. 437. See *Coupling-pin*.
- Round (of a ladder).** The horizontal bars on which the foot rests. They are called rounds, whether of wood or iron, and whether round or square. See *Ladder-rounds*.
- Round seat-stop.** Figs. 1183-4. See *Seat-stop*.
- Rubber-centre spiral-spring.** Figs. 2044, 2048. A spiral spring with the space inside the coil filled with india-rubber. Practically obsolete. See *Rubber spring*.
- Rubber cushion (Cowell platform and coupler).** 23, fig. 538. More properly, *buffer-cushion*, which see.
- Rubber gasket (of engine signal-valve, West. train signal apparatus).** 11, fig. 690. See *Gasket*.
- Rubber floor-mat.** Fig. 836-7. There are two leading styles, *corrugated* rubber and *perforated* rubber.
- Rubber packing-ring (triple-valve Westinghouse car-brake).** 11, figs. 332-3. A circular india-rubber gasket which forms a seat for the triple-valve piston.
- Rubber spring.** Figs. 2042-8. A car-spring made of india-rubber. They are now rarely used, it having been found difficult to secure uniform quality, and the cost of a really good quality being higher than steel spiral springs of equal efficiency and durability. The same is true of the various rubber and steel compound springs, figs. 2043-48. In England rubber springs are still largely used for draft and buffing, and, if of good quality, they are quite durable.
- Rubber-tread (for step).** An india-rubber covering fastened to a step of a car to prevent persons from slipping when ascending or descending the steps.
- Runners (foundry).** Apertures which connect the *ingate*

of a mould for casting metals with spaces to be filled with molten metal.

**Running-board.** 4, fig. 669; 10, figs. 252-4; 87, figs. 82-133. A plane surface, made usually of boards, for train men to walk or run on. It is placed on the roof of box or stock cars and at the side of tank cars. Gondola and flat cars usually have none, but hopper-bottom cars frequently have a running-board passing over the tops of the end-rails and drop-door beam. By resolution of the M. C. B. Association at the 13th Annual Convention it was recommended "that the running-boards be not less than 18 in. wide and 1 in. thick, the ends to project 5½ in. outside of the boarding, the projections to be supported by two braces (*running-board brackets*) made of 1½ in. by ¼ in. iron." Figs. 656-7 show the running-board as so specified, but the dimension is wrongly given as 2 in. by 1½ in. The same error appears in some of the official reprints of the standards.

2. (Tank-car.) 119, figs. 139-42. The only substitute for a car-floor.

**Running-board bracket.** Figs. 656-7; 89, figs. 87-96. See above.

2. (Tank-car.) 120, figs. 139-42. Cast-iron knees attached to the main-sills of a tank car, and projecting outward to support the running-board.

**Running-board extension.** 88, figs. 87, 94; figs. 656-7. The part which extends beyond the end of the car-body so as to bring the ends of the running-boards on adjoining cars nearer together to facilitate the passage of trainmen from one car to another.

The M. C. B. Association has recommended (fig. 656-7) a projection of 5½ in. outside the boarding.

**Running-pipe (Gouge heater, which see).** Fig. 1470-1. A pipe carrying the heat under the seats along the sides of the car.

**Russia iron.** A form of sheet iron manufactured in Russia, the exact process for making which has heretofore been kept secret, but which consists essentially in forming a chemical compound of iron upon its surface at the same time that it is highly polished, so that it is not likely to rust. Modern substitutes for this iron are also known as *planished iron*, which see. See *Russia-iron casing* (Spear heater). Fig. 1522.

## S

**Saddle.** "A seat or pad to be placed on the back of an animal to support the rider or the load."—*Knight*. Here, a block or plate which acts as a bearing or support for a rod, beam, etc., in construction, is called a saddle. See *Body truss-rod saddle*. *Spring-saddle*. *Truss-rod saddle*. *Bolster truss-rod saddle*.

**Safety-ball** (Köhler stove). **L**, fig. 1474. A round cast-iron ball carried upon *safety-ball lugs*. **M**, within a spherical enlargement of the smoke-pipe in such manner that in case of the overturning of the stove the ball will close the opening to the smoke-pipe at the top so as to prevent the escape of hot coals.

**Safety-ball lugs** (Köhler stove). **M**, fig. 1474. See above.

**Safety-beam** (passenger-car trucks). **51**, figs. 1907-69. A longitudinal timber connecting the *end-piece* and *transom* above the axles and inside of each *wheel-piece*. Iron straps (*axle safety-bearings*) are attached to the beam and pass under the axles so as to hold them in position in case of a breakage of axles or wheels on either side. An additional *middle safety-beam* is used on six-wheel trucks, **52**, fig. 1969.

**Safety-beam block.** **53**, figs. 1960-62. A block fastened to the under side of a safety-beam and to which a *safety-strap* is attached. It is put there to bring the safety-beam nearer to the axle, and is usually cut out so as to conform to the shape of the latter.

**Safety-beam iron.** **60**, fig. 1969. A wrought-iron bar or casting bolted to the transom (six-wheeled truck), by which the *middle safety-beam* is attached to the transoms.

**Safety-beam tie-rod.** **59**, figs. 1955-69. A longitudinal rod alongside a safety-beam, tying the *end-piece* and *transom* together. A *safety-beam truss-rod* sometimes serves as a substitute and equivalent.

**Safety-beam truss-rod.** **57**, figs. 1946-7. A long longitudinal rod parallel with a safety-beam, extending from one end-piece truck to the other, under the transoms, so as to support them, in addition to serving as a substitute for *safety-beam tie-rods*, which see.

**Safety-beam truss-rod bearings.** **58**, figs. 1945-7. Cast or wrought-iron pieces attached to the transoms. See above.

**Safety-bearing.** See *Axle safety-bearing* for the *safety-beam* above. **54**, figs. 1955-73.

**Safety-bearing thimbles.** See *Axle safety-bearing thimbles*. **56**, figs. 1955-73.

**Safety berth-latch.** Figs. 1261-2 and 1263-4. A device by which it is made impossible for the berth to shut itself automatically in case of accidental overturning of the cars. In order to enable the latch to snap shut automatically, the handle must be either pulled out, as in the *Howard safety berth-latch*, figs. 1621-2, or pushed in, as in the *Dayton berth-latch*, figs. 1263-4. These devices enable the *berth safety-rope*, which see, **11**, fig. 676, to be dispensed with. Several deaths have been caused by the upper berth closing up and locking a passenger within it in cases of overturning for lack of one or the other of these devices.

**Safety-chain.** 1. See *Brake safety-chain* (for brake-beams), **9**, figs. 236-46. *Safety coupling-chain* (for draw-gear), figs. 428-30.

2. (English.) **46**, figs. 205-207. American equivalent, *safety coupling-chain*. An additional coupling-chain provided at one end with a hook, and intended to hold the train together should the main coupling part. Two are secured at each end of the vehicle, one on each side of the main coupling. Also called *side-chain*.

**Safety-chain eye bolt.** See *Brake safety-chain eye-bolt*.

**Safety coupling-chain** (passenger-car platforms.) Figs. 428-30; **4**, fig. 686. A chain attached to the platform end-timber and hooked to an eye in the platform of an adjoining car or tender so as to prevent the train from being separated in case the coupling should be detached. They are necessarily used in pairs, an eye and a chain with hook being attached to opposite sides of the same platform.

The safety coupling-hook represented in fig. 428 experience has shown to be somewhat too long. Two and a half inches is considered ample. When using the Miller draw-gear it not unfrequently happens that the hooks become disengaged on very sharp curves, but recouple again after leaving, the train being held together meantime by the safety coupling-chains.

**Safety-flues** (Winslow heater). **C**, fig. 1536, and **E**, fig. 1534. Tubes connecting the *safety-tank* with the *fire-pot*, to enable the water to extinguish the fire in the case of overturning.

**Safety-grate** (Baker heater). **9**, fig. 1301; fig. 1310. A perforated plate on top of the fire-pot over the fire to prevent the latter from falling out in case of overturning.



**Safety-grate latch** (Baker heater). Fig. 1316. See above.  
**Safety-grate spring** (Baker heater). Fig. 1311. See above.  
**Safety-guard** (for spring-plank). Fig. 2113. An iron strap attached to the truck transoms and passing under the spring-plank to hold up the latter in case of accidental rupture of the link-hangers. More properly *spring-plank safety-strap*, which see.

**Safety-hanger**. See above, also *Brake safety-chain*. *Brake safety-strap*. *Safety-hanger* (for lower brake-rod).

**Safety-hanger** (for lower brake-rod). A metal loop or eye attached to a truck and through which the lower brake-rod passes. It is intended to prevent the brake-rod from falling on the track in case it or its connections should break. See note to fig. 1967.

**Safety lamp-fastening** (Creamer's, which see). Fig. 847.

**Safety latches**. Figs. 1261-4. See *Safety berth-latch*.

**Safety-latch handle** (of berth safety-latch, which see). 42, fig. 679; figs. 1261-4.

**Safety-rope** (for sleeping-car berths). 11, fig. 676, and figs. 1246-7. More properly *berth safety-rope*, which see. See also *Safety berth-latch*.

**Safety-strap**. See *Axle safety-strap*. *Brake safety-strap*. *Spring plank safety-strap*.

**Safety-tank** (for Winslow heater). A, figs. 1534-6. A circular tank, constituting the base of the heater, which is kept full of water, and is connected with the *fire-pot B*, by *safety-flues C*, so that in case the car is overturned the water will be discharged through the flues on to the fire. It is provided with a *filler E*, and a *discharge-cock D*. See *Safety water-base* (Bissell heater).

**Safety-valve**. 1. (Baker heater.) 26, fig. 1301; fig. 1322. A valve formed of an India-rubber ball with which an opening on top of the *circulating-drum* is closed. When the pressure in the drum exceeds the elasticity of the rubber ball, the latter permits the steam or hot water to escape, and thus relieve the former.

2. (Searle heater.) G, figs. 1434-5.

3. (Westinghouse brake.) 1, figs. 295-7. A small valve attached to the main reservoir.

4. (Westinghouse driving-wheel brake.) A valve attached to the pipe which connects the cylinder of the driving-wheel brake with the air-reservoir, and which permits the air to escape when its pressure exceeds a certain point, so as to prevent skidding the wheels.

**Safety-valve ball** (Baker heater). Fig. 1329. See *Safety-valve*.

**Safety water-base** (Bissell heater). Fig. 1386. A tank around the bottom of the stove for containing water, to put out the fire in case of the overturning of the stove. The ash-box is situated in the middle of the water-base.

**Safford drawbar**. Figs. 448, 453-4, 459-60, etc. A drawbar patented by J. B. Safford, which consists of cutting out a recess or "cove" in the side to give room for the hand in coupling.

**Saloon**. 1. "A lofty, spacious apartment."—*Worcester*.

2. The main room in a compartment car (rarely used).

3. One of the smaller subdivisions or state-rooms of a sleeping or parlor car, as fig. 211.

4. 130, figs. 155-56, 211, etc. A retiring room furnished with urinal and closet-hopper, or soil-hopper; sometimes in the more luxurious cars with a water-closet. The ladies' saloon is commonly also provided with washing facilities. Other terms are *lavatory*, *closet*, *toilet*, etc.

**Saloon carriage** (English). Answers the same purpose as an *excursion car*, or *American private car*. A luxurious vehicle, one or more of which is kept for hire on most English railways, having one or more large compartments, about 15 ft. long, fitted with tables, sofas, etc., and termed *saloon*, which word is never used in England in the American sense, 4, above. See also *Carriage*.

**Saloon door-plate**, or *notice-plate*. Fig. 1099.

**Saloon furnishings**. Figs. 1087-1107.

**Saloon-handle**. Fig. 1106-7. See *Urinal-handle*.

**Saloon-hopper**. Fig. 1090-6. See *Closet-hopper*. Also called *soil-hopper*.

**Saloon hopper-ventilator** (Bell's, which see). Fig. 1097-8.

**Saloon-latch**. Fig. 989-1010. A latch for saloon doors, which consists of a spring-bolt, usually with a *stop* on the inside, which locks the bolt fast, or with a separate bolt for fastening the door from the inside. See below.

**Saloon-lock**. Figs. 1022-4. The same as a saloon-latch, with provision for locking the door from the outside. Saloon latches without locking facilities are rarely used.

**Saloon paper-hook**. Fig. 1095. See *Paper-hook*.

**Saloon-plate**. See *Notice-plate*.

**Saloon-roof**. A, figs. 187-90. In some of the more modern cars the saloon is entirely roofed over so as to be distinct

from the body of the car. This separate roof, however, is not usual, the partitions being generally carried up to the roof of the car.

**Saloon-seat.** 131, figs. 156-82. The wooden seat over a closet-hopper.

**Saloon side-light** (Pintsch gas-lighting apparatus, which see). Figs. 814-5.

**Saloon stop-latch.** Similar to figs. 995, 998, 1005-10. See *Saloon-latch*.

**Saloon ventilating-jack.** Figs. 1092-4. See *Ventilator*.

**Sand-blast process.** A process of cutting glass by blowing sand upon it with a strong blast of air. The glass is covered with paper or other elastic surface which it is found the sand does not cut at all while rapidly cutting away the glass itself. The process was invented by observing the action of sand blown by the wind upon the rocks in the western plains of the United States and is now largely used in place of *wheel-cutting*.

**Sand-plank.** 43, figs. 1907 to 1968. A common name for *spring-plank*.

**Sash.** The frame of a window or blind in which the glass or slats are set, but commonly used, especially in compound words, as a substitute for *window*, meaning the window and sash complete. The various members used in framing a sash are the same as a *door-frame*, which see.

See <i>Deck-sash</i> .	<i>Swinging-sash</i> .
<i>Door-case window-sash</i> .	<i>Upper door-sash</i> .
<i>Door-light</i> (English).	<i>Ventilator-sash</i> .
<i>Door-sash</i> .	<i>Window-blind sash</i> .
<i>Lower door-sash</i> .	<i>Window-sash</i> .
<i>Mirror-sash</i> .	

**Sash bar-lift.** Figs. 1668 and 1672. A sash-lift having a projecting bar sufficiently large to be grasped by the entire hand. Chiefly used for heavy double windows, in parlor cars, etc.

**Sash-fastener.** A *Sash-lock*, which see.

**Sash-holder.** See *Sash-lock*. *Spring sash-holder*.

**Sash-lift.** 21, figs. 679-81, 692-5; figs. 1610, 1665-78. A metal finger-hold attached to the bottom-rail of a window-sash for raising and lowering it. They are sometimes let in *flush* and so called (fig. 1667), but usually attached on the outside. Sometimes, but rarely, the sash-lift is a mere *knob*, fig. 1671, and so called. In *Wolfrath's combination sash-lift*, figs. 1700-2, what is ordinarily termed the sash-lift is known as the *lifting-plate*. A

*window-blind lift*, which see, is a somewhat similar device. See *Sash bar-lift*. *End-door sash-lift*.

**Sash-lock.** 22, figs. 678-95, figs. 1659-61. A spring-bolt attached to a window-sash, or (rarely) a window-blind, provided with thumb-lever (*sash-lock trigger*), to withdraw the bolt with by one hand, while the sash is lifted by the other. Both hands must thus be used. Devices to accomplish this end less awkwardly are: *Sash-balance* (figs. 1703-7), and *Wolfrath's combination sash-lift and lock* (fig. 1700-2). See also *Deck-sash latch*.

In the common form of sash-lock, the *sash-lock bolt* 1 is pressed outward by the *sash-lock spring* and moved inward when desired by the *sash-lock trigger*. The bolt enters with a *sash-lock bushing*, let into the parting-strip or other part of the window-casing. In place of the bushing, *sash-lock stops*, or *sash-lock plates*, fastened upon the outside of the window-casing, or let in flush, are sometimes used, and occasionally a *sash-lock rack*. A *sash-lock lower stop* is often added at the bottom to hold the sash shut and prevent it from being opened from the outside.

The former edition of this work termed this part the *window-latch*, giving the following note:

"A variety of terms are used to designate this part of a car. In most of the trade catalogues it is called a *sash-lock*, but Webster says the word lock is 'now appropriated to an instrument composed of a spring, wards and a bolt of iron or steel, used to fasten doors, chests and the like. *The bolt is moved by a key*'. Knight says a lock is 'a device having a bolt moved by a key, and serving to secure a door, lid or other object.' The device used for fastening car windows is therefore not properly a lock, because it has no key. Of the word latch Webster says: 'The primary sense of the root is, to catch, to close, stop, or make fast.' Therefore *window-latch* was the term adopted to designate this device."

*Sash-lock*, however, seems to continue to be the established and almost universal designation, and there is room for question, as noted under *lock* and *latch*, which see, whether the true distinction between them is not rather that a *latch* has a beveled bolt and a *lock* a square bolt, instead of whether or not a key is used.

**Sash-lock bolt.** 1, figs. 1659-61. See above.

**Sash-lock bushing.** Fig. 1654. See above.

**Sash-lock lower stop.** Figs. 1608, 1660-2. See above and *Sash-lock stop*.

**Sash-lock plate.** Figs. 1655-57. A *sash-lock stop*. See above.

**Sash-lock rack.** Fig. 1658. See above. (*Wolfrath's combination sash-lift and lock*, which see.) A, fig. 1700.

**Sash-lock spring.** 2, fig. 1661. See *Sash-lock*.

**Sash-lock stop.** Figs. 1608, 1656-62. There are two kinds



of stops, *upper stops* for holling the window open, and *lower stops* to hold it shut. *Sash-lock bushings, plates, or racks*, are substitutes and equivalents for sash-lock stops. See *Sash-lock*.

**Sash-lock trigger.** 3, fig. 1659-61. See *Sash-lock*.

**Sash-lock 'upper-stop.** 23, figs. 679-81; figs. 1608, 1660-2. See above.

**Sash-opener.** Figs. 1003-06. A contrivance, as a lever or rod, for opening a window, used chiefly for the *deck-sashes*, which are out of reach. See *Deck-sash opener*.

**Sash parting-strip.** 83, fig. 175; 16, figs. 632-4; 68, fig. 1844. A strip of wood attached to the window-post of a passenger car which acts as a distance-piece between two sashes and against which the latter slide. Also called *bead* and *parting bead*, which see.

**Sash-pivot.** Figs. 1611-42. A metal pin or pivot attached to a sash on which the latter turns. The term almost always means a *deck-sash pivot*.

**Sash-prop.** Figs. 1652-3. A *window-button*, which see.

**Sash-pull.** Figs. 1634-5. See *Deck-sash pull*.

**Sash pull-hook.** Fig. 1556. See *Pull-hook*.

**Sash-rail.** 12, 14, figs. 692-5. A horizontal bar in the outside frame of a window or blind. See *Window-blind rail*.

**Sash-rest (street cars).** See *Window-sash rest*.

**Sash-spring.** A metal spring attached to the edge of the stile of a window or blind sash to prevent it from rattling. They are made of various forms. A *single window-sash spring* consists of a metal plate, like fig. 1649, attached to the sash at one end. Fig. 1648, *double window-sash spring*, is a metal plate fastened in its centre to the sash. Others are of a spiral form, *spiral window-sash springs*, fig. 1650, let into the sash.

**"Savage" lamp-burner.** Fig. 897. One of the no-chimney burners.

**S-brake (Kalamazoo lever hand-car).** 2, figs. 1724-6. A brake so formed as to be applied to both wheels at once by revolution of a shaft between them, to which it is attached.

**Scantling (carpentry).** "Lumber under 5 in. square used for studs, braces, ties, etc. It is expressed in terms of its transverse dimensions."—*Knight*. An upright scantling is termed a *stud*, as 29, figs. 1821-24.

**Scarf.** "A joint uniting two pieces of timber endwise. The ends of each are beveled off and projections are some-

times made in the one corresponding to concavities in the other, or a corresponding concavity in each receives a jiggle" (or packing-block).—*Knight*. Fig. 651 is a scarf joint, technically known as a *ship splice*, prescribed by the rules for interchange of traffic for splicing any broken sills but the centre sills.

**Scheme-rod (postal cars).** A rod supported upon the *scheme-rod bracket*, figs. 1063-8, and carrying the *scheme* or schedule of the proper distribution of mail matter for the various post-offices, used in distributing mail.

**Scraper.** See *Snow-scraper*.

**Screen (for base-plate of Spear heater).** Fig. 1508. A register-like plate permitting the entrance of cold air to the stove.

2. (For beater-room doors, wash-room panels, etc.) Fig. 1046. A perforated plate of sheet metal, usually *japaned*, which see, used as an ornamental finish.

3. (For hood of Spear and other heaters.) 7, figs. 1486-3. A perforated plate or wire netting, through which the air admitted is screened to exclude cinders.

**Screw.** 1. "A cylinder surrounded by a spiral ridge or groove, every part of which forms an equal angle with the axis of the cylinder, so that if developed on a plane surface it would be an inclined plane. It is considered as one of the mechanical powers."—*Knight*. When used alone the term commonly means a *wood-screw*, having a slotted head and gimlet point, for driving in with a screw-driver. *Machine screws* are similar, except that they have no gimlet point and have a metal screw-thread. They are used for uniting metallic parts. All ordinary forms of bolts have screw-threads cut on them, but are not commonly called screws. A special form of wood-screw is a *lag-screw*, fig. 1863, which is a large-sized screw with a head like a bolt, so that it may be inserted with a wrench instead of a screw-driver. See *Screw-thread*.

2. See *Oil-screw*.

**Screw-burner.** Figs. 892, etc. A lamp-burner to which the chimney is fastened by a small screw passing over a lip or rim on the bottom of a chimney. It is the oldest form of burner, but now little used. See *Lamp-burner*.

**Screw-coupling (English).** 41 to 45, figs. 205-207. The means by which passenger train vehicles are coupled together. On the Continent it is used for both passenger and freight cars. It comprises a right and left handed

screw provided with a hinged weighted handle, which always hangs downward, so that it has no tendency to unscrew and slacken the coupling, and two nuts with gudgeons taking in eyes of U-shaped coupling links or shackles. The screw-coupling may be either loose, or one shackle may be attached to the drawbar.

**Screw-coupling nut, and gudgeons (English).** 44, figs. 205-207. See above.

**Screw-coupling weighted lever (English).** 45, figs. 205-207. See above.

**Screw-gauges.** Figs. 1832-3. Instruments for measuring the diameter or size of screws. They are of two kinds: *external*, for measuring male screws, and *internal*, for measuring female screws. See also *Screw-pitch gauge*. *Screw-thread gauge*.

**Screwless knob-shank and knob.** Figs. 1003-7. The chief modern style of car door-knob, which see.

**Screw pitch-gauge.** Fig. 1831. "A gauge for determining the number of threads to the inch on screws and taps. It consists of a number of toothed plates turning on a common pivot, so that the serrated edge of each may be applied to the screw until one is found which corresponds therewith. The figures stamped on the plate indicate the number of threads to the inch."—*Knight*. In the ordinary single thread screw, the pitch is indicated by the number of threads to an inch.

**Screw-thread.** Figs. 1825-34. The groove, or the material between the grooves, which is cut on the outside surface of a cylinder to form a male screw, or on the inside surface of a cylindrical hole to form a nut or female screw. *Metal* screw-threads and *wood* screw-threads, which see, are of different form. *Pipe* screw-threads, which see, are usually V-shaped, but all other threads in common use for ordinary purposes are made by the *Whitworth* or *Sellers standard screw-threads*, which see, the former being the European and the latter the American standard.

At the M. C. B. Convention, Philadelphia, 1882, it was "Resolved, That this Association deprecates the use of screws larger or smaller in diameter by a small fraction of an inch than the sizes specified for the Sellers or Franklin Institute system, and that all the members of the Association are urged to abandon entirely the use of over or under size screws."

**screw-thread gauge.** Fig. 1830. A steel plate with

notches in the edge of the precise form of screw-threads, used for giving the proper form to the edges of screw-cutting tools. That illustrated is adapted to the *Sellers* system, which see, recommended by the Franklin Institute, and adopted by the Army and Navy departments of the United States, and by the Master Mechanics' and Master Car-Builders' associations. See *Sellers system of screw-threads*.

**Screw-top (bell-cord hangers).** 3, fig. 736, etc. A simple form of *bell-cord hanger bracket*, which see.

**Scribing.** The fitting of the edge of a piece of timber or metal to another more or less irregular surface. Scribing is usually done by marking a parallel line to the surface which it is designed to fit by a pair of compasses or with a *scribe-awl*.

**Scroll-iron (English).** 88, 90, fig. 205. A wrought-iron forging, carrying a vertical *spring-link adjusting-screw*. The form shown is a special pattern. The upper face is attached to the under side of the sole-bar, and the lower part is bored horizontally for the *adjusting-screw*. In general use on passenger service.

**Scutcheon (of a lock).** Fig. 1000, etc. Properly, *escutcheon*, which see.

**Seals.** Figs. 1108-19, 1011, 1018. See *Car-seals*. See also *Glass seal*. *Lead seal*. *Lock seal*. *Rivet seal*.

**Seal-holder.** Figs. 1014-15, etc. See *Paper and glass seal-holder*.

**Seal-hook.** Fig. 1110. An iron hook inserted into the hasp of a freight-car door, to which a seal wire and metal seal are attached. This simple form is now little used.

**Seal-lock (freight car).** Figs. 1011-18. A lock in which a seal made of glass, paper, or other material is inserted in the lock in such a manner as to cover the bolt or the key-hole. The lock cannot be opened without breaking the seal. See *Car-seal*.

**Seal-press.** Fig. 1111. A pair of levers arranged like a pair of pincers, with two dies in which lead car-seals are compressed on the wire to which they are attached, leaving an impression on the lead so that if the seals are removed or defaced it can be known. Similar seal-presses are used for eyelet shackles.

**Seal-wires.** Figs. 1109-19. Several strands of fine wire twisted together like a rope, or single bars of twisted flat wire, by which leaden seals are attached to car-doors.



There are various special forms, called *detective wires*, as fig. 1117, to prevent stripping the seal.

**Seal-wire opening** (car-door fastener). **A**, figs. 1108-9. A hole for inserting the shackle of a seal.

**Seaming lace** (English). **205**, figs. 204, 205, 206. An ornamental woolen fabric made in bands about  $\frac{1}{2}$  inch wide, and used to cover the seams and joints in the upholstery of a carriage. It is sewn to any textile fabric, and has two tape edges, and is wrapped round a piece of seaming cord which is stitched inside. It differs from *pasting lace*, which see.

**Searle heater**. Figs. 1484-5. One of the class of heaters which relies upon the circulation of hot water through the car. The water is kept from the danger of freezing by the addition of salt. It has a strong general similarity to the *Baker heater*, which see. The especial features claimed for the heater are the arrangement of the *expansion-drum* and some similar minor details.

**Seat**. 1. "That on which one sits."—*Webster*.

2. Figs. 1120-1230. "The flat portion of a chair or sofa to support the person."—*Knight*. See *Car-seat*, special forms, which also see, being—

<i>Adjustable roller car-seat.</i>	<i>Perforated-veneer seat.</i>
<i>Cane seat.</i>	<i>Rattan-seat.</i>
<i>Corner-seat.</i>	<i>Reversible seat.</i>
<i>Hartley chair.</i>	<i>Revolving chair.</i>
<i>Horton chair.</i>	<i>Right and left-hand seat.</i>
<i>Longitudinal seat.</i>	<i>Side-seat.</i>
<i>Mason-rocker car-seat.</i>	<i>Slat seat, etc.</i>
<i>Parlor-car chairs.</i>	

See also *Saloon-seat*.

3. In *Mechanics*: "The part on which another thing rests, as a *valve-seat*."—*Knight*.

See <i>Axle-seat.</i>	<i>Rubber-seat.</i>
<i>Bolster-spring seat.</i>	<i>Side-seat.</i>
<i>Discharge-valve seat.</i>	<i>Slat-seat.</i>
<i>Equalizing-bar seat.</i>	<i>Spring-seat.</i>
<i>Equalizing-bar spring-seat.</i>	<i>Tank-valve seat.</i>
<i>Leather-seat.</i>	<i>Wheel-seat.</i>

4. (For hand-car.) **12**, figs. 1720-3. A horizontal board placed lengthwise over the wheels above a *rave*, for the occupants to sit on.

**Seat-arm**. **13**, figs. 1120-2; figs. 1170-1; also figs. 1167-91. An arm by which the back of a seat is attached to the *seat-end* or to the side of the car. Such arms are usually attached by a *pivot*, so that the seat-back can be reversed. Sometimes called *striker-arm* and also *seat-back arm*.

Special forms of seat-arms are the *solid nipple seat-arm*, which see; *Cobb's pivoted seat-arm*, designed to enable the back to be raised higher; *Gardner's geared seat-arm*, fig. 1131, designed to change the slant of the seat when the back is reversed, and *Buntin's seat-arm*, fig. 1139, which unites the seat and seat-back in one piece.

This term is also used to designate the portion of a seat-end (more properly called *seat-end arm*), which supports the arm of a person sitting in the seat, as **5**, figs. 1120 and 1122; and sometimes, incorrectly, to designate an *arm-cap*, figs. 1197-8, which see.

**Seat-arm pivot**. Figs. 1167-9. A metal pivot by which a *seat-arm* of a reversible seat is attached to a *seat-end* or the side of a car. In some cases, as fig. 1174, the pivot is made in one piece with the *seat-arm plate*, which is attached to the seat-end. The two combined then become a *seat-arm pivot-plate*, which see. A *seat-back arm pivot* or *swing-joint* is used in *Cobb's pivoted seat-arm*, fig. 1171. A seat-arm pivot is sometimes called in the trade a *seat-arm rivet*. The most improved form is a *solid nipple seat-arm pivot*, fig. 1168.

**Seat-arm pivot-plate**. Figs. 1172-4, 1179. See above.

NOTE.—Figs. 1172-3 should be entitled in the engravings *seat-arm plate* instead of *seat-arm pivot-plate*, since they carry no pivots attached to them. Fig. 1174 is a true seat-arm pivot-plate.

**Seat-arm plate**. Figs. 1129, 1172-9. A plate fastened to a seat-end with a hole in the centre which receives and holds a *seat-arm pivot*. In some cases the pivot is made in one piece with the plate. The part formed by combining the two is then called a *seat-arm pivot-plate*, which see. See also note to *seat-arm pivot-plate*.

**Seat-arm rocker** (*Cobb's pivoted seat-arm*). **2**, fig. 1171. A bar resembling the rear portion of an ordinary seat-arm which is attached to the seat-arm proper by a *swing-joint* or *seat-back-arm pivot*, **3**.

**Seat-arm stop**. Figs. 1180-4, etc. A *seat-stop*, which see.

**Seat-arm washer**. **1**, figs. 1170-1, 1175. A small washer for the head of a screw by which a seat-arm is fastened to a seat-end. Now little used.

**Seat-back**. **11**, figs. 1120-2; **125**, figs. 155-85. That part of an ordinary American car-seat which forms a support for the back. It has an arm called the *seat-arm* attached to it, by which it is attached to the *seat-ends* with a *seat-arm pivot*, so that it can be swung over so as to face the

other way. In some cases on steam cars, and usually on street cars, *longitudinal* seats are used, with the backs against the side of the car. See *Slat seat-back*. *Flexible-top seat-back*. *Sectional seat-back*. The *Buntin seat-end*, which see, has the seat and seat-back in one.

**Seat-back arm.** A *seat-arm*, which see.

**Seat-back-arm pivot.** 1. (Cobb's pivoted seat-arm, which see.) 3, figs. 1171, 1132. The *swing-joint* or *seat-back pivot* in the seat-arm.

2. A *seat-arm pivot*, which see.

**Seat-back band.** Figs. 1199-1204. A *seat-back moulding*, which see.

**Seat-back board** (street cars). 42, figs. 1843-4. A board placed between the two *seat-back rails* of a longitudinal seat. Usually made in the form of a raised panel so as to make a comfortable rest for the back.

**Seat-back corner** (emigrant sleeping cars). Fig. 1298. A brass corner-plate carrying a lug to guide the back when making up the seats into berths.

**Seat-back curved-stop.** 14, fig. 1120; figs. 1126, 1181-2. A seat-back stop, which see, of a curved form, resembling somewhat a letter S.

**Seat-back moulding.** 12, figs. 1120-2; figs. 1199-1204. A wood or (usually) metal band or moulding fastened around the edge of a seat-back to give it a finish and protect it from wear.

**Seat-back pivot** (Cobb's striker-arm). Figs. 1171, etc. The pin by which the seat-arm is pivoted to the back. See *Cobb's pivoted seat-arm*. It should not be confused with a *seat-arm pivot*, which see.

**Seat-back rail** (street cars). Figs. 1843-6. Two narrow rails, *upper* and *lower*, which form the top and bottom of a longitudinal seat inclosing the *seat-back board* between them.

**Seat-back round-stop.** Figs. 1183-4. A round *seat-stop* which see.

**Seat-back slats.** Narrow strips of wood used to form a seat-back; used chiefly for seats which are not upholstered.

**Seat-back spring.** A weak spring placed in the upholstering in the back of a seat. Usually called simply *back-spring*.

**Seat-back stop.** See *Seat-stop*, 14, figs. 1120-4, 1125-6, 1181-4.

**Seat-board** (English). 150, figs. 205-6. In a carriage, the support for the *seat sofa-springs*. These springs are tied down, and a piece of canvas is stretched tightly over them, the cushion resting on this canvas.

**Seat-bottom** (street cars). 34, figs. 1843-4. The boards or floor in a seat-frame on which a cushion rests, or on which persons sit when no cushion is used. It is attached to the *back* and *front seat-bottom rails*.

**Seat-bottom rail.** See above.

**Seat-bracket** (hand-car). 13, figs. 1720, 1723. A wrought-iron knee which supports the seat.

**Seat-bracket brace** (hand-car). 14, fig. 1723.

**Seat-cord** (Mann boudoir car). 4, figs. 680-1. A cord used to hold up the lower seat while removing the bedding for night use.

**Seat-cushion.** Figs. 1205-26. A soft pad or pillow on which passengers sit. Two kinds of cushions are used on cars: a *squab-cushion*, which is a loose pad and is now little used, and *box-cushion*, which is a cushion built upon a *cushion-frame*, with springs, etc. See *Back-squab* (English).

A great variety of forms of seat-cushions exist, the leading ones of which are shown. Special forms, separately defined, are, as respects material, *woven wire*, *rattan* or *cane*, *canvas-lined*; as respects mode of construction, *flexible-top*, *elliptic*, *broad-band elliptic*, *spiral-elliptic*, *Bushnell*, *spring-edge*, *sectional*, *drop-down frame*, etc., etc.

2. (English.) 196, figs. 204-6. American equivalent, *squab cushion*. In a first-class carriage, a flat, loose *squab* cushion, about four inches thick, covered with broadcloth on one side and leather on the other, and stuffed with curled horse hair. It is *reversible*, and often so called.

**Seat-division** (longitudinal seats). 126, figs. 161-6. A bar of wood or metal to separate the space occupied by a passenger from that adjoining it.

**Seat-end.** 123, figs. 155-85; 2, fig. 1120; 3, fig. 1122; figs. 1192-1204. A frame of wood or metal at the end of a car-seat which supports the arm of the occupant and to which the seat-arm is attached. Seat-ends are designated *long* or *short*, according to whether they extend entirely to the floor or are supported upon a *seat-stand*, 6, fig. 1120. They are also designated as *aisle seat-ends*, or *wall seat-ends*, and, for corner seat-ends, as *left-hand* or *right-hand* seat-ends, which see.



See also *Buntin's seat-end*. *Corner seat-end*.

**Seat-end arm.** 5, figs. 1120-2. The portion of a seat-end which supports the arm of a person sitting in the seat.

**Seat-frame** (Hartley chair, which see). 12, figs. 1154-8. See *Pedestal*.

**Seat-hinge** (sleeping cars). Figs. 1231, 1292. A strap-hinge used to connect a seat with the seat-back. See also *Sofa-hinge*.

**Seating.** Fig. 1218. See *Canvas-lined rattan seating*. The *plush* which is commonly used to upholster car-seats is also sometimes called seating.

**Seat-joint bolt.** Fig. 1189. A bolt for fastening a *seat-rail* to *aisle seat-ends*. It is also used at the wall ends.

**Seat-leg** (longitudinal seats). 35, figs. 1843-4. A wooden post which supports a front seat-rail.

**Seat-leg plate.** Figs. 1196, 1245. A metal plate with which the front of a seat-end or leg is covered to protect it from injury.

**Seat-lever** (Howard's parlor-car water-closet). Figs. 1087-89. A lever, projecting backward from the seat-lid, to which the *connecting-rod* is attached.

**Seat-lid** (Howard's parlor-car water-closet). Figs. 1087-89. A lid connected with the *pan* and *service-measure* by the *connecting-rod* in such a manner that on raising it the pan is brought up into position and about half a gallon of water is discharged from the service-measure.

**Seat-lock.** 15, figs. 1122-4, 1125, 1176-7. A lock for holding the back of a seat so that its position cannot be reversed. Such locks are attached either to the seat-end, seat-back arm, or seat-back stop. A form for iron seat-ends with a smaller escutcheon, not provided with screw-holes, is sometimes distinctively called a *barrel-lock*, although the term is almost equally applicable to any form of seat-lock. Seat-locks operate by simply pushing the key inward and not by turning it.

**Seat-lock bolt.** 1, figs. 1176-7. The beveled bolt by which locking is effected.

**Seat-lock key.** Fig. 1178. A key for opening a seat-lock. It works simply by pushing in and not by turning.

**Seat-lock spring.** 2, figs. 1176-7. The spring which moves the bolt.

**Seat-pull** (sleeping cars). Figs. 1243-8. A flush handle for pulling out the seat in making up the berth so as to drop the back and seat to the same level.

**Seat-rail.** 1, figs. 1120-22. One of a pair of wooden rails,

front and back, resting on and attached to the seat-end and to the side of the car, and which supports a cushion-frame or seat-bottom.

**Seat-rail bracket.** Figs. 1187-8. A support for a wooden seat-rail. In iron seat-ends it is frequently cast upon it.

**Seat-rail knee** (English). 119, figs. 204-205. A piece of wood secured to the door pillar and supporting the seat-rail. It is generally slotted to receive a leather strap, restraining the undue opening of the door.

**Seat-rail support** (English). 119, figs. 204-5. A piece of hard wood supporting the seat and securing it to the side of the body of a carriage. It is often pierced for a leather strap limiting the opening of the door.

**Seat-riser.** 1. (Street cars). Figs. 1843-6. A vertical board or front of a seat, extending from the seat-rail to the floor; seldom used with reversible seats.

2. (Hand-car). 15, figs. 1720-3. A *rave*, which see.

**Seat-slat.** A narrow strip of wood which forms part of a seat-bottom.

**Seat-spring.** Figs. 1209-29. A spiral or other metal spring used to give a seat elasticity. *Spiral* springs are the most common, but *elliptic* and *spiral-elliptic* are also used. A special form of seat-springs called *back-springs*, of little resistance, is used for seat-backs. English seat-springs, 203, fig. 205, are called *sofa-springs*, and the back-springs, *back squab sofa-springs*.

**Seat-stand.** 124, figs. 155-185; 6, fig. 1120. A support, usually made of cast-iron, on which an *aisle seat-end* rests. Very commonly the seat-stand and seat-end are in one part, which is then called a *long seat-end*.

**Seat-stop, or a seat-arm stop.** 14, figs. 1120-2, 1100, 1125-6, 1181-4. A metal lug or bracket attached to a seat-end and sometimes to the side of the car on which the *seat-arm* rests. Seat-stops are either attached to a long plate (*curved* or *straight seat-stop*), as in figs. 1180-2, or as in *round seat-stops*, figs. 1183-4, have a flange entirely surrounding them, by which they are attached to the seat-arm or side of the car.

**Seat-webbing.** A form of coarse canvas used in upholstering car-seats.

**Second catch** (of car-door fastener). Figs. 1108-9. A double hook or eye placed in the hasp of a car-door lock in such manner that the door can, if desired, be locked, leaving a crack open for ventilation.

**Secondary brake-rod.** 1. (Hodge brake). 6, fig. 235. A

rod which connects one end of a floating-lever with one of the brake-levers.

2. (Tanner or Elder brake.) 6, figs. 228-35; 152, fig. 108; 132, figs. 1843-6. A rod which connects the centre brake-lever, Tanner or Elder brake, with one of the brake-levers on the truck. On a four-wheeled car it is the rod which connects the centre lever with one of the brake-heads.

**Second-class car.** A plainly-finished passenger car for carrying passengers who pay a lower rate of fare than first-class passengers do. Such cars are rarely used, the smoking car usually serving this purpose for the small number of so-called second-class (in reality, third-class) passengers. See *Coach*. *First-class car*.

**Second-class carriage (English).** A vehicle adapted to carry passengers paying an intermediate rate of fare, the fittings being less expensive and comfortable than in the first-class. Each compartment measures about 6 feet in the length of the carriage and seats 10 passengers. See also *Carriage*.

**Section.** 1. (Of a seat-cushion). Figs. 1215-6. See *Sectional seat-cushion*.

2. (Of a sleeping car, which see.) Fig. 678. Two double berths, one above the other, making up into two seats facing each other by day. There are from 8 to 12 sections in a car, usually 10, besides the state-rooms.

**Sectional seat-cushion.** Figs. 1214-20. One with spiral springs separately attached to narrow slats so that the seat can be made up or repaired in sections.

**Sector.** In geometry: "A part of a circle included by an arc and the two radii drawn to its extremities."—*Davies*. Hence, any object whose shape is that of a part of a circle ought to be called a sector, but as a matter of fact it is generally called a *quadrant*. See *Deck-sash quadrant*. *Draubar-sector*. See also *Quadrant for grain-door*, 3, figs. 373-6.

**Self-acting ventilator.** Figs. 1553-69. An *automatic-ventilator*, which see.

**Self-closing faucet, or cock.** Fig. 1591. A faucet having a horizontal bar-handle provided with a spring by which it is closed when released. *Telegraph-cocks*, which see, figs. 1592-5, and also *compression-cocks*, fig. 1596, are also self-closing, but not distinctively so-called.

**Self-fitting journal-bearing.** Figs. 1993-4. See *Hopkins' journal-bearing*.

**Self-loading truck (Johnson's, which see).** Fig. 1906.

**Self-locking or spring padlock.** Figs. 1031, 1036-7.

One which snaps locked by pressure only, without using a key, in distinction from a *dead padlock*.

**Sellers system of screw-threads.** Figs. 1829, 1834. A system of screw-threads designed by William Sellers, of Philadelphia. The following table gives the number of threads to the inch and the proportion of the threads of the Sellers system. See also fig. 1834.

TABLE GIVING PROPORTIONS OF THE SELLERS SYSTEM OF SCREW-THREADS.

Width of top and bottom of thread in decimals of an inch.....	Diameter of screw at the root of the thread in decimals of an inch.....	Number of threads per inch.....	Outside diameter of screw in inches.....	Width of top and bottom of thread in decimals of an inch.....	Diameter of screw at the root of the thread in decimals of an inch.....	Number of threads per inch.....	Outside diameter of screw in inches.....
$\frac{1}{4}$	.185	.0062	1	$\frac{1}{4}$	.185	8	.837
$\frac{1}{8}$	.240	.0074	$1\frac{1}{8}$	$\frac{1}{8}$	.240	7	.940
$\frac{3}{16}$	.294	.0078	$1\frac{1}{4}$	$\frac{3}{16}$	.294	7	1.065
$\frac{1}{2}$	.344	.0089	$1\frac{1}{2}$	$\frac{1}{2}$	.344	6	1.160
$\frac{5}{8}$	.400	.0096	$1\frac{3}{4}$	$\frac{5}{8}$	.400	6	1.234
$\frac{3}{4}$	.454	.0104	$1\frac{7}{8}$	$\frac{3}{4}$	.454	$5\frac{1}{2}$	1.389
$\frac{7}{8}$	.507	.0113	2	$\frac{7}{8}$	.507	5	1.491
$\frac{15}{16}$	.560	.0125	$2\frac{1}{8}$	$\frac{15}{16}$	.560	5	1.616
1	.620	.0138	$2\frac{1}{4}$	1	.620	$4\frac{1}{2}$	1.712
$\frac{1}{2}$	.731			$\frac{1}{2}$	.731		.0277

The form of the threads is an essential part of the system and is shown in fig. 1829. The angle at which the sides of the thread stand to each other is 60 degrees, and the top and bottom of the threads are made flat. The proportions of the threads are determined by the following rule given by Mr. Sellers: "*Divide the pitch, or, what is the same thing, the sides of the thread, into eight equal parts; take off one part from the top and fill in one part in the bottom of the thread; then the flat top and bottom will equal one-eighth of the pitch, the wearing surface will be three-quarters of the pitch, and the diameter of screw at bottom of the thread will be expressed by the formula:*



$$D = \frac{1.299}{N},$$

in which  $D$  = diameter of the screw and  $N$  = the number of threads per inch.

This system was recommended by a committee appointed by the Franklin Institute in 1864; was adopted as the standard by both the Army and Navy departments of the United States, and has been recommended by both the Master Car-Builders' and the Master Mechanics' associations as the standard to be used in the construction of cars and locomotives. It is often called the *Franklin Institute standard* and also the *United States standard*; but, as it was designed by Mr. Sellers, it should be known as the *Sellers system*.

**Semaphore lens.** Figs. 954-5. A trade name for a cheap modification of the Fresnel lens, the latter term being more generally restricted to those having the back a plane or nearly cylindrical surface.

**Service-measure** (Howard's parlor-car water-closet). Figs. 1087-89. An auxiliary tank holding about a half-gallon of water connected with the seat-lid and water-tank and discharging the water on raising the lid only.

**Set** (of elliptic springs). 2, fig. 2032. The amount of compression of which the spring is capable. The distance between the *spring-bands* when unloaded. The *arch* is half the set, plus the thickness of the spring-band.

**Set of springs.** All the springs for carrying the weight of one car, not including draw-springs. A *set of bolster-springs* consists of the springs which are placed between the truck-frames and carry the weight of the body only. A *set of equalizing-bar springs* means all the springs for a car on the equalizing-bars. A *set of wheel or journal springs* means all the springs which are placed directly over the journal-boxes of one car.

**Set of wheels.** This term means a number of wheels sufficient for one car. A *set of wheels and axles* means the requisite number of wheels fitted to axles complete for one car. A *pair of wheels* means two wheels already fitted to an axle, including the axle; but a *set of wheels* does not include the axles unless specified.

**Set-bolt** (Lindsay's steel-tired wheel). A series of eight bolts passing through an arm of the wheel-centre, relied upon to hold the tire from slipping in one direction, the flanges preventing it from slipping in the other. The tongue of the tire is left about  $\frac{1}{32}$  of an inch

smaller than the groove in the body, and the plate is not screwed up tight, leaving about  $\frac{1}{32}$  of an incl. play. Thus  $\frac{1}{32}$  inch is left in case of breakage to relieve the strain on the tire before it comes on to the fastenings.

**Set-screw, or stud-fastening** (English). Figs. 2153, 2154, 2179-80. As applied to railroad wheels, a mode of securing the tire to the wheel which is becoming obsolete. A modification is the *set-screw fastening* (English), *plain-end*, fig. 2154. Though superior to the other it is being superseded by better methods. See *Tire-fastening*.

**Setting-die** (for carpet-eyelets). No illustration. A device, one form of which is very similar to fig. 1108, for forming eyelets by compressing the grommets together. Usually, however, with large eyelets, it is done with a hammer.

**Seven-group spiral-spring.** Fig. 2080. See *Spiral spring*.

**Sextuplet** (of elliptic springs). Six elliptic springs coupled together, side by side, to act as one.

**Shackle.** 1. (Of a padlock.) **A**, figs. 1029-30, etc. A U-shaped bar which is passed through the *staple* in front of the *hasp* by which the padlock is used to lock the object. The inner end **D** of the shackle is termed the *heel*, which is sometimes provided with the *shackle-spring G* and **I** to hold the shackle open or shut.

The shackle of cheap padlocks is attached to projecting *ears*, but in those of better quality the heel is entirely within the lock itself. The shackle is sometimes termed the *hasp*, but this usage is incorrect.

2. (Of car-seals.) Figs. 1112-19. The wire or metal strip passing through the fastening to be sealed and closed together at the end. See *Car-seal*.

**Shackle-bar.** Figs. 431-42. A *coupling-link*, which see.

**Shackle-guard** (of a padlock). **F**, figs. 1029-30. A plate used in some padlocks lying immediately under the point of the shackle when locked in place, serving to exclude dirt and wet from the interior.

**Shackle-lock** (car-door fastener). **D**, figs. 1108-9. A term used in distinction from the seal-lock.

**Shackle-spring.** **D** and **G**, figs. 1029-30. See *Shackle*.

**Shackle-stop** (Miller's padlock). **H**, figs. 1036-7. A stop to prevent the shackle escaping too far in unlocking.

**Shad-bellied tank** (tank cars, which see). A *telescopic tank*.

**Shade.** See *Lamp-shade*, figs. 942-8. *Window-shade*, figs. 1683-92.

**Shade-cap** (of a lamp). 33, figs. 827½-71. A vertical tube extending the shade upward and constituting in effect an extension of the chimney. A similar part for a lamp-globe is called a *globe-chimney*.

**Shade-ring**. Figs. 937-9. See *Adjustable shade-ring*. Also called *wire tripod*.

**Shade-roller** (for window-shades.) Figs. 1683-6. A device serving the purpose which its name implies, the only forms of which now in general use are the *automatic* forms, which hold the shade in any position when released by means of *centrifugal-pawls*, which see. The leading styles are the *Hartshorn* shade-roller and the *McKay* shade-roller, which see. The Hartshorn works with a pawl on the end, while the McKay has a cam. There is no conflict of patent.

**Shaft**. "That part of a machine to which motion is communicated by torsion."—*Webster*.

See <i>Brake-shaft</i> .	<i>Drum-shaft</i> .
<i>Crank-shaft</i> .	<i>Horizontal brake-shaft</i> .
<i>Docr-shaft</i> .	<i>Lever-shaft</i> (street cars).
<i>Driving-shaft</i> .	<i>Winding-shaft</i> .

**Shaker**. See *Grate-shaker*. *Shaker-handle*.

**Shaker-door** (Johnson heater). 19, fig. 1472.

**Shaker-door frame** (Johnson heater). 20, fig. 1472.

**Shaker-handle** (Bissell heater). Figs. 1369, 1390.

**Shank** (Kirby's car-door lock). A', figs. 1003-4. The spindle. See also *Buffer-shank*. *Grate-shank*. *Lock-shank*.

**Shank-facing** (Kirby's car-door lock). P, figs. 1003-4.

**Shears** (of a pile-driver car). Figs. 1821-4. The tongs which grasp the *hammer*, which see.

**Sheathing**. 52, figs. 82, 96, etc. Boards which are tongued and grooved, and with which the sides of cars are covered. The sides of a gondola car are ordinarily termed *side-plank* and *end-plank*, and are much heavier than the sheathing of a box-car. *Inside sheathing* is sometimes used, leaving the side-frame of the car exposed. *Inside lining*, which see, is in addition to the ordinary outside sheathing.

**Sheave**. A wheel, roller or pulley over which a cord or rope runs, or on which any object, as a door or window, rolls. *Sheave* is often used to designate a block or pulley, but more properly it designates simply the grooved wheel in the block. See *Pulley*.

See also *Bell-cord sheave*. *Main sheave*.

<i>Brake-lever sheave</i> .	<i>Pile-hoisting sheave</i> .
<i>Brake-shaft-chain sheave</i> .	<i>Sliding-door sheave</i> .
<i>Centre brake-lever sheave</i> .	<i>Strap-sheave</i> .
<i>Door-sheave</i> .	

**Sheave-hook** (derrick cars). 2, figs. 77-78. The hook carried at the lower end of a *hoisting-block* to which the load is attached.

**Sheave-pin, or pintle**. 5, figs. 77-78. The axle of a sheave. See *Pintle*.

**Sheet iron**. Iron rolled thin and, in car work, usually *galvanized*. Its thickness is given by its number of *wire gauge*, which see. The standard sizes are 6 and 8 ft. long and 24, 26, 28, and 30 in. wide. It is, however, manufactured to order up to 10 ft. long and 44 in. wide. *Sheet steel*, *galvanized* or not, is now also largely manufactured.

**Sheet-ring and staple** (English). 80, figs. 116-9. A small wrought-iron ring to which are tied the cords attached to the edges of the tarpaulin protecting the contents of an open wagon from the rain.

**Sheffield hand-car**. Figs. 1712-9. A name applied to several varieties of hand-cars, taken from the name of the designer, but more particularly applied, *first*, to an ordinary section hand-car with wooden wheels, and *secondly*, to a three-wheel hand-car for inspection purposes.

**Shelf**. See *Spring-shelf* (street car journal-boxes).

**Shell**. See *Berth-latch shell*.

**Shelled-out** (car-wheels). A term applied to wheels which become rough from circular pieces shelling out of the tread, leaving a rounded flat spot, deepest at the edge, with a raised centre. The M. C. B. rules for *interchange of traffic*, which see, specify that no wheel shall be condemned for this fault unless the spots are over 2½ in. in length, or their number is so great as to interfere with the safe running of the wheel.

**Shield** (Gouge heater). Fig. 1466. A plate covering the opening formed by the *shield-box*. The *shield-feet* hold out the shield from contact with the deck-sash so as to leave an opening to admit air.

**Shield-box valve** (Gouge heater). Fig. 1441. A box for the escape of bad air, projecting through the deck-sash and connecting with the *exhausting weather-cap*, fig. 1408.

**Shield-feet** (Gouge heater). 93, fig. 1444. See *Shield*.

**Shifting-pinion** (hoisting-gear). 13, figs. 77-78; W, figs.



151-3. A pinion attached to the *crank-shaft* or *driving-shaft* of a hoisting-gear which is constructed to slide laterally a few inches so as to have a slow-motion or quick-motion gear according to the position of the shifting-pinion.

**Shim.** A thin piece of wood or metal used as a distance-block to save more careful fitting. In track-work, shims are very largely used in order to remedy the heaving of the rails from frost. Shimming has been used in fitting on car-wheels when the wheel-seat of the axle was a little too small, but the M. C. B. rules for interchange of traffic forbid this.

**Ship splice.** Fig. 651. One of the many forms of splicing or *scarfing* broken pieces of timber. It is that selected for splicing broken car-sills under the regulations for *interchange of traffic*, which see. See *Scarf*.

**Shoe.** A plate, block or piece of any material on or against which an object moves, usually to prevent the latter from being worn. See *Boom-shoe*. *Brake-shoe*. *Door-shoe*.

**Short-sill, or short floor-timber.** 5, fig. 83. An auxiliary longitudinal timber used in a car-floor, but not extending its whole length.

The term *short floor-timber* is also applied with questionable propriety to short auxiliary cross-pieces, as 5, fig. 106, used in freight-car floors as distance-blocks between the sills and *not* extending across the whole width of the floor. Corresponding timbers in passenger cars are termed floor-timber distance-blocks.

**Short plate-rod.** 192, figs. 94-5. Horizontal bolts passing through the *plate-bolt strip* and the *plate*, serving to stiffen the latter horizontally.

**Short seat-end.** 2, fig. 1120. A seat-end which does not extend below the seat or support it, but is supported upon a separate *seat-stand*. See *Seat-end*.

**Short T-bolt** (Janney coupler, which see). 14, figs. 542-554, 555-601. The bolt connecting the *horn* and *combination yoke*. The long T-bolt passes through the *centre buffer-spring*.

**Shot** (in chilled car-wheels). See *Cold-shot*.

**Shunting** (English). The act of moving cars from one track to another, as in making up or separating trains. In this country usually called *switching*. *Marshaling*, which see, has a nearly similar meaning. Sometimes *drilling* or *regulating*.

**Shutter** (for cabin of pile-driver car). 13, figs. 1821-

1824. A wooden cover for a window, especially one having no sash.

**Side.** See *Deck side*. *Ladder-side*. *Truck-side*.

**Side arm-rest, or elbow rest** (English). 201, figs. 204, 205, 206. A wooden support for the elbow attached to the inner sides of a carriage beneath the windows, and padded with horsehair and covered with broadcloth or leather. See also *Folding arm-rest*. In American cars a *window-ledge* is made to serve the same purpose, but *arm-rests*, 26, fig. 678, are generally added in sleeping-cars. They are mere round bars, covered with plush, but not padded.

**Side-bearings.** Supports placed on each side of the centre-pin of a car, to prevent too much rolling or rocking motion of the car-body. Usually there is a plate of iron or steel attached to the body-bolster on each side of the centre-pin, called a *body side-bearing*, 16, figs. 83-95, etc.; 14, figs. 163-85, etc., and a corresponding plate, block or roller on the truck-bolster, called the *truck side-bearing*, which see, 61, figs. 1907-69. They are also distinguished as *lower* and *upper* side-bearings. Generally there is a little space left between the bearings, so that the truck can turn freely on the centre-plate, although in some cases the weight of the car-body rests on the side-bearings instead of the centre plates. To obviate friction, *cup side-bearings*, 61, figs. 1967-62, are so formed as to hold a lubricant. *Rocker side-bearings*, fig. 2030, and *roller side-bearings*, fig. 2028, are also used.

**Side-bearing bridge or arch-bar** (six-wheeled truck). 62, figs. 1969-70. An iron bar, truss, or wooden beam attached to the spring-beams to support the truck side-bearing.

**Side-bearing rocker.** Fig. 2030. See *Side-bearing*.

**Side-bearing roller.** Fig. 2028. See *Side-bearing*.

**Side-board.** 1. (Dining cars.) Figs. 193, 214, etc. An ornamental receptacle for dishes, etc., usually placed so as to face the central compartment of the car. See *Buffet-car*.

2. (English.) 67, fig. 116. American equivalent, *side-plank*. A planking constituting the sides of the car.

**Side body-brace.** 33, figs. 84-136; 51, figs. 155-65. Commonly, simply *body-brace*, which see, except when the *end-braces* are to be distinguished from them.

**Side body-brace rod.** 34, figs. 89, 93; 52, figs. 177-8. See above.

**Side-casting.** Fig. 447. See *Drawbar side-casting*.

**Side foot-rest** (passenger cars). 10, fig. 1122, etc. A metal plate fastened to the truss-plank between the seats, for passengers to rest their feet on. Chiefly used over heater-pipes as a guard to prevent the feet of passengers from coming in contact with the hot pipes.

**Side-frame.** 1. (Of a car-body.) Figs. 82-645. The frame which forms the whole side of a car-body. It includes the posts, braces, plate, rail, girth, etc. See *Framing*.

2. (Of a truck.) Figs. 2025-2030. See *Truck side-frame*. *Diamond-truck*.

**Side-gutter, or outside-cornice** (English). 132, figs. 204-7. A piece of wood secured on the outside of the vehicle at the angle of the roof to the sides. It is channeled on the top to catch the rain and convey it to the ends of the vehicle, to prevent it running down the sides.

**Side-gutter moulding** (English). 133, figs. 204-7. A moulding which is attached to the outer side of the side-gutter in order to hide the heads of the bolts by which it is secured.

**Side hopper-plates** (hopper-bottom cars). 28, figs. 109-12. In distinction from the hopper-plates proper, which form the inclined floor.

**Side journal-spring** (street cars). 6, figs. 1843-4. One of a pair of spiral or rubber springs which rest on ledges on each side of a journal-box.

**Side-lamp.** Figs. 851-71. A lamp attached to the side of a passenger car. In distinction from a *centre-lamp*, which hangs from the roof; they are usually made with brackets by which they can be conveniently fastened. See also *Alcove-lamp*.

2. (English.) American equivalent, *side tail-light*. A colored signal lamp carried at the side of the last vehicle of a train. Two red *side-lamps* and one red *tail-lamp* are generally carried, arranged in the form of a triangle.

**Side-lamp braces.** 18, fig. 859. Diagonal bars attached to a side-lamp and to the side of a car to steady the lamp.

**Side-lamp bracket.** 17, fig. 858. See *Side-lamp*.

**Side-lamp holder.** 16, fig. 858. A metal ring or bowl-

shaped receptacle usually attached to a bracket to hold a lamp.

**Side-lamp iron** (English). 184, figs. 205 and 207. American equivalent, *tail-light holder*. A wrought-iron lamp-holder secured to the outer side of the body to carry the colored *side-lamp*, which see. See also *Signal-lamp*.

**Side-pawl** (Creamer brake, which see). 10, figs. 263-4.

**Side-piece** (for platform-hood). 10, fig. 186. A thin block cut to the curve of the hood.

**Side-plank** (gondola cars). 196, figs. 113-5. The boards bolted to the stakes constituting the sides of the car. They vary from 2 to 3 ft. or more in height according to its capacity and are generally 2 in. thick. Those at the end of the car are termed *end-planks*, and are usually hinged at the bottom so as to drop down inwardly on to the floor of the car.

**Side-plate.** 46, figs. 85-135; 98, figs. 155-176; 47, figs. 1843-46. More properly, simply *plate*. The longitudinal stick on top of the posts of the car-body. So called as distinguished from the *end-plate*.

**Side-pulley** (of bell-cord guides, which see). 1, figs. 723-5.

**Side-rest** (tip-car). 160, fig. 143. A block of wood or metal on top of the frame on which the body rests when tipped.

**Side-seat.** Figs. 1217, 1843-6. A longitudinal car-seat, the back of which is against the side of a car. See *Car-seat*.

**Side-sills, or outside-sills.** 1, figs. 82-104 and 155-176; 8, figs. 1843-46. The exterior *sills*, which see. Sometimes the outside-sills only are referred to by the single word *sill*, but this use of the word is uncommon. The side-sills are usually made deeper than the inside-sills in flat and gondola cars, but not in box and stock cars. In tank cars and some coal cars they are the only sills. *Iron* side-sills are usually *channel-bars*, which see, the examples shown in figs. 144-9 being an 8-inch channel-bar weighing 52 lbs. per yard. The centre and intermediate sills are 8-inch I-beams, which see, weighing 85 lbs. per yard.

**Side-spring** (Janney-Miller coupler). 55, fig. 602. A spiral spring actuating the Miller hook laterally. The Janney coupler, from its peculiar rack movement of the *knuckle* or coupling-hook in coupling, requires no side-play.

**Side-spring bolt** (Janney-Miller coupler). 52, figs. 554, 555-601. The bolt securing the side-spring in place.



**Side-spring eye-bolt** (Janney-Miller coupler). 67, figs. 554, 602-35. The eyes attached to the Janney *horn* in which the *side-spring stirrup* engages, for use only with the Miller hook.

**Side-spring plate** (Janney-Miller coupler). 45, figs. 542-554, 555-601. The plate or bracket sustaining the side-spring.

**Side-spring stirrup** (Janney-Miller coupler). 54, figs. 542-554, 555-601. The part inserted in the *eye-bolts* fixed to the Janney *horn* connecting the *side-spring bolt* to the Miller hook.

**Side-spring trigger** (Janney-Miller coupler). 63, figs. 602-35. A kind of detent-latch used for relieving the tension of the side-spring while the couplers are being changed.

**Side-spring washer** (Janney-Miller coupler). 59-60, figs. 602-35. A collar and cup washer used in connection with the side-spring.

**Side-step** (street cars). 114, figs. 1843-4. A ledge usually made of a wrought-iron plate attached to the side of the platform. Also called *foot-board*.

**Side-stop**. 1. (Grain-door.) H, fig. 378.

2. (Tip-cars.) 162, fig. 143. A cast-iron support attached to the wheel-piece, on which the body rests, and by which it is held in a horizontal position.

**Side-straps** (gondola cars). 194, figs. 113-5. The straps to which the end-plank and sometimes also the side-plank are bolted. It serves also as a bearing for the *side-strap tie-rod* 195.

**Side-strap tie-rod** (gondola cars). 195, figs. 113-5. A horizontal bolt connecting the *side-strap* with the *end-plank*.

**Side top-panel rail** (English). 117, figs. 204, 205. A part of the body-framing running horizontally in the upper part of the side of a carriage.

**Side-urinal**. Figs. 1100-1, 1105. A urinal to fit against the flat *side* of a room, in distinction from a *corner* urinal. The latter are almost universal in car work.

**Side urinal-handle**. Fig. 1106. So called in distinction from a corner *urinal-handle*, which see.

**Siding**. 1. A side track.

2. See *Sheathing*.

**Signal-bell** (street cars). 97, fig. 1843 ; fig. 1859. A saucer-shaped bell attached to each platform. They are rung

by a clapper, to which a strap is attached which extends from one platform to the other.

2. (Locomotives.) A similar bell to which the *bell-cord* is attached.

**Signal-holder, or igniter**. Fig. 1043. A device for burning blue-lights and igniting them by friction, produced by pushing in a piston. See also *Torpedo*.

**Signal-lamp, or signal-light**. Figs. 956-71. A name applied to lanterns of extra power and quality of several kinds, but usually meaning those provided with *semaphore* or *bull's-eye* lenses, which see, of which from one to four are used, whence the name single-lens, double-lens, etc. They are also called *side tail-lights*, *tail-lights*, *operator's signal-lights*, etc. A special variety having changeable colors are *inspectors' lanterns*, figs. 960-73.

**Signal-pipe** (Westinghouse train-signal apparatus, which see). G, fig. 687 ; 27, figs. 324-5. A continuous pipe running from car to car through the train, substantially a duplicate of the brake-pipe, but working with a much lower pressure of air. The *signal-pipe couplings* are also substantially similar to brake-hose couplings, but have a thicker lip, so that they cannot be misconnected with the brake pipe.

**Signal-pipe coupling** (Westinghouse train-signal apparatus). E, fig. 687 ; 32, figs. 324-5. See above.

**Signal-pipe stop-cock** (Westinghouse train-signal apparatus). 28, figs. 324-5. A cock placed at each end of every car for closing the signal-pipe at the rear of the train.

**Signal-reservoir** (Westinghouse train-signal apparatus). C, fig. 687. A small auxiliary reservoir for operating the train signals carried on the locomotive and connected with the main reservoir through a *reducing-valve*, fig. 691, for the purpose of reducing the pressure to about two atmospheres, which is all that is required for operating the signals.

**Signal-strap** (street cars). A *bell-strap*, which see.

**Signal-valve** (Westinghouse train-signal apparatus). D, figs. 687, 690. A valve attached to the signal-pipe on the engine, which, on the opening of the *car signal valve* in any car, and the consequent reduction of pressure in the signal-pipe, permits the air to escape to blow the signal-whistle F.

2. The *car signal-valve* is often called simply signal-valve, as at 30, figs. 324-5.

**Signal-whistle** (Westinghouse train signal apparatus). F, fig. 786. See *Signal-valve*.

**Sill**. 1. "Properly, the basis or foundation of a thing; appropriately, a piece of timber on which a building rests. The lowest timber in any structure, as the sills of a house, of a bridge, of a loom, and the like.

2. "The timber or stone at the foot of a door; the threshold.

3. "The timber or stone on which a window-frame stands, or the lowest piece in a window-frame."—*Webster*.

4. (Car building.) Figs. 82-185, etc. The main longitudinal timbers, usually six but sometimes eight in number, which are connected together transversely by the *end-sills*, *body-bolsters*, and *needle-beams* or *cross-frame lie-timbers*. Sills are divided into *outside sills*, or simply *side-sills*, *intermediate sills*, and *centre-sills*. Sometimes the word sill is used referring only to *outside sills*, but this use is unusual. A few cars, such as dump cars, and tank cars, figs. 139-142, have but two sills, and others, as in figs. 105-108, only four. The splice for broken sills required by the regulations for the interchange of cars is shown in fig. 651. It is required to be 24 in. long.

See also *Deck end-sill*.

*Deck-sill*.

*End-sill*.

*Platform end-sill*.

*Platform-sill*.

*Platform short-sill*.

*Short-sill*.

*Swinging platform-sill*.

5. The lower horizontal member of the frame surrounding a window or door. See *Door-sill*. *Window-sill*.

**Sill-and-plate rod**. 36, figs. 87-142; 54, figs. 155-78. A vertical iron rod which passes through the sill and plate of a car-body frame and ties the two together. A *brace straining-rod*, which see, is a similar part for low passenger-car trusses below the windows.

**Sill knee-iron**. 9, figs. 89-95; 8, figs. 170, 182. An L-shaped or right-angled iron casting or forging bolted into the inside corner of a car-frame to strengthen it.

**Sill-splice**. Fig. 651. See *Ship-splice*.

**Sill-step** (freight cars). 30, figs. 82-143; figs. 656-7. A U-shaped iron attached to the sill of a car, below the ladder, as a step for getting to or from the ladder. The M. C. B. Association recommended, Chicago, 1879 (figs. 656-7), "That two good substantial steps (*sill-steps*).

made of wrought iron  $\frac{1}{2}$  by  $1\frac{1}{4}$  in., be fastened, one to each side-sill, at diagonal corners of the car."

**Sill-step stay**. 31, figs. 102-4, 139-41. A diagonal iron rod or bar attached to one of the sills and to a sill-step to stiffen the latter. Not commonly required or used.

**Sill tie-rod**. 10, figs. 103, 140-2; 9, figs. 155-85. A transverse tie-rod in the floor of a car for holding the sills together.

**Single-board car-roof** (freight cars). Figs. 664-5. A roof, of which several varieties other than those shown exist, in which one layer of boards covered by some kind of sheet metal is used in place of double boards. All single-board freight roofs use a sheet-metal cover, either above or below the boards, but those only having sheet metal on top are commonly so called.

**Single or end berth-rest** (emigrant sleeping-berths). N, figs. 682-5. A bracket to support the berth when open. So called in distinction from the berth-rests proper (double) on the berth-posts.

**Single-driver steam brake** (American Brake Co.). See remarks to figs. 363-5. See also *Driving-wheel brake*.

**Single-edge weather-strips**. Fig. 1698. See *Weather-strip*.

**Single-guard** (for lanterns). Fig. 981. According to the number of horizontal wires surrounding the globe, lanterns are designated as *single*, *double* or *triple-guard*.

**Single-hole clevis** (Am. aut. comp. brake). 26, figs. 368-9. So named in distinction from the *three-hole clevis*, both being a part used to connect the *lower connecting-rod* to the brake-lever.

**Single-lever brake**. Figs. 230, etc. A brake which has but one lever to a truck or four-wheeled car, which see, to apply to two brake-beams. In some cases applied to but one of the trucks of a car; in other cases, to both. An objection to this form of brake is that the pressure is not equal on each brake-beam. To overcome this difficulty two levers are used, and the brake, as shown in fig. 231, is then called a *double-lever brake*, which see.

**Single pipe-strap**. Fig. 1333. A pipe *clip*, which see.

**Single-plate wheel**. Figs. 2131-2, 2144-5. A cast-iron wheel, in which the hub and tire are united by only a single plate, which is strengthened usually by ribs called *brackets*, fig. 2131, or sometimes by *corrugations*, figs. 2144-45. See *Wheel*. *Car-wheel*.

**Single sash-spring**. Fig. 1649. See *Sash-spring*.



**Single-screw turnbuckle.** Fig. 1881. A turnbuckle, which see, shaped like a link of a chain with a screw at one end and a swivel at the other.

**Single window-blind.** A blind which is made in one piece or section and large enough for one window. They require a lower window, and hence are rarely used in the better grades of passenger cars unless *flexible*, which see. See also *Window-blind*.

**Single window-blind lift.** Figs. 1677-82. See *Window-blind lift*.

**Sink (dining-cars).** Fig. 214.

**Six-group spiral-spring.** Fig. 2079. See *Spiral spring*.

**Six-wheel truck.** Figs. 1969-73. Six-wheel trucks may be said to be the standard for sleeping, parlor and dining cars. They are sometimes, though rarely as yet, built of iron. The parts peculiar to six-wheel trucks will be seen in Roman type under fig. 1968. See *Truck*. *Car-truck*.

**Skeleton (steel-tired wheels).** Figs. 2163-76. Another term for the *wheel-centre* or *central filling-piece*, which see. The word skeleton is principally used when the wrought or cast wheel-centre consists of open bars.

**Skew-back.** 1. (Masonry.) The face on the edge of the abutment against which the arch proper abuts.

2. (Of a truss.) 7, figs. 2185-6. A casting on the end of a truss or a trussed beam to which a truss-rod is fastened. It is usually made in the form of a cap, and forms a bearing for the truss-rod nuts.

3. (Car-building.) A *truss-rod washer*, which see.

**Slab.** 3, fig. 1570. See *Wash-stand slab*.

**Slanting table-leg.** Fig. 679. One which abuts against a *slanting table-leg plate* in the side of the car instead of standing vertically, as in fig. 678.

**Slanting table-leg hook.** Fig. 1547. See above.

**Slanting table-leg plate.** Fig. 1548. See above.

**Slat.** A narrow piece of board or timber, such as *seat-backslats*, *seat-slats*, *window-blind slats*, which see.

**Slat cattle-car.** Figs. 5-7, 33-4, etc. A *stock car*, which see.

*at-seat.* A seat composed of narrow strips of wood. These are usually placed longitudinally on the seats with a space between them.

**Slat-wire (Wilson's flexible car-window blind).** W, fig. 1646. The wire on which the slats are strung.

**Sleeping car.** Figs. 50, 54-5, 60-1. A car provided with sleeping-berths or beds for the use of passengers at night,

which make up by day into ordinary seats, as shown in figs. 676-8. By far the greater number of the sleeping cars are operated by the Pullman Palace Car Co., and are hence often referred to simply as *Pullman cars*. The Mann boudoir car, which see, is an American invention recently re-introduced from Europe. *Emigrant sleeping cars*, figs. 195, 203, which see, have recently been introduced, resembling ordinary sleeping cars, but without upholstery.

The first sleeping car built in the United States was made in the shops of the Terre Haute, Alton & St. Louis Railroad by a mechanic named Woodruff. The coach provided seats for sixty passengers, which were convertible into flat berths. The patent was secured in 1856-7. The next sleepers were two of the same kind run on the New York Central Railroad. Webster Wagner, founder of the Wagner Palace Car Co., built and patented four sleepers for the New York Central Railroad in 1858. The modern palace sleeping car was introduced by George M. Pullman, who built his first car in 1859. Some of the early Pullman cars had sixteen wheels instead of twelve. The first Wagner palace car was built in 1867. Both Wagner and Pullman paid royalties to Woodruff.

See *Sleeping-car section*. *Lower-berth*. *Upper-berth*.

**Sleeping-car furnishings.** Figs. 1231-99.

**Sleeping-car section.** The space in a sleeping car occupied by two double seats in day-time and by two berths or beds at night. In figs. 676-7 two sections are shown, and in fig. 678 one. There are usually 10 sections, but sometimes 8 or 12 in a car, in addition to a state-room, smoking compartment, etc.

**Sleeve.** See *Piston-sleeve*. *Stake-sleeve*.

**Sleeve.** 1. (Of car-door lock.) C, figs. 1003-4; D, fig. 1005. The part connecting the knob to the shank.

2. (Cowell platform and coupler.) 4, fig. 538. A piece of iron with a socket to receive the end of the *slide-pin* (3) fastened upon the *cross-bar* (5).

**Slewing-gear (for swinging-platform of pile-driver car).** 48 and 49, figs. 1821-2. The means for causing the swinging-platform to revolve. It consists of a *hand-wheel* and *spur-wheel*, the latter engaging in the *slewing-rack* fixed to the floor of the car.

**Slewing-rack (of pile-driver car).** 50, figs. 1821-4. See above.

**Slewing-rings (of a derrick).** 22, figs. 77-8. Rings attached to the upper end of the boom for attaching a rope by which to move or steady it when loaded.

**Slide (of lamp platform).** C, fig. 1190. The board used as a step. See also *Feed-door slide*.

**Slide-pin** (Cowell platform and coupler). **3**, fig. 538. The bar connecting the *rock-lever* **2** with the *sleeve* **4** on the *cross-bar* **5**. When forced forward by operation of the adjusting *wedge* **6** it transmits the pressure to the *buffer-springs* **14**.

**Slide-valve** (Westinghouse triple-valve). **6**, figs. 332-3, 353; **5**, figs. 355-7. A D-valve controlled in its motion by the piston, by means of which the air is admitted to, and exhausted from, the brake-cylinder, applying and releasing the brake. See also *Reversing valve*.

**Sliding-bolt** (of a padlock). **B**, figs. 1029-30; **3**, fig. 1031. The bolt in the interior of the padlock which engages with the *shackle*, locking it to place. The forward end of the bolt is termed the *bit*. The movement of the sliding-bolt is controlled by the *sliding-bolt spring* **H**.

**Sliding-door**. A door opened by sliding sideways instead of swinging on hinges. Such doors are almost universally used on freight-cars. They are hung by a hook called the *door-hanger*, which slides on a top door-track. See also *Car door-hanger*.

**Sliding-door bracket**. A *door-track bracket*, which see.

**Sliding-door fixtures**. Figs. 371-2, 791-801. See also *Car-door hanger*, *sliding-door lock* and *latch*.

**Sliding-door friction-roller**. Fig. 1855. A small wheel attached to the top of a sliding-door to make it run easily. It does not carry the weight of the door.

**Sliding-door pull** (parlor-car doors). Fig. 747. A device having a handle which can be pulled out to open the door, and then closed up flush with its face.

**Sliding-door handle**. **1**, **6**, figs. 746-9, 990.

**2**. (Street cars.) **91**, fig. 1845; fig. 1851.

**Sliding-door holder** (street cars). Fig. 1851. A metal hook by which a sliding-door can be fastened on the inside.

**Sliding-door latch**. Figs. 746-9, 990, 1858. A latch made with a hook lifting vertically instead of a bolt sliding horizontally, for fastening sliding-doors.

**Sliding-door-latch keeper**. Fig. 1857. Also called a *strike-plate*.

**Sliding-door-latch plates** (street cars). **92**, fig. 1845; **1**, fig. 1851.

**Sliding-door lock**. Figs. 746-9, 991. A lock made especially for fastening sliding-doors. Such locks usually have a hook which engages in a corresponding catch attached to the door-post. The hook is secured in con-

nection with the catch by means of a bolt which is operated by a key.

**Sliding-door sheave** (street cars). Fig. 1854. See *Door-sheave*.

**Sliding-door track**. See *Door-track*.

**Slip lamp-burner**. Figs. 880-3. A burner in which the chimney is held in place by springs or screws, and so constructed that the entire slotted cap to the burner may be removed at once by lifting, still carrying the chimney, without removing any spring.

**Slip lamp-chimney**. Fig. 934. A chimney with cylindrical base, held in place by lateral springs, so as to be removable by lifting only. Similar to a *sun chimney*, which see, but smaller at the base.

**Sloping closet-hopper**. Fig. 1096. See *Closet-hopper*.

**Slow-motion gear** (of a derrick or crane). **10**, figs. 77-8; **X**, figs. 151-153. A system of gearing, intended to be used or not at will by means of a *shifting-pinion*, to decrease the speed and increase the power of the hoisting-gear. Called also *intermediate gear*.

**Small equalizing-guide** (Janney-Miller coupler, which see). **49**, figs. 542-554, 555-601. See also *Equalizing-guide*.

**Small window** (passenger cars). **139**, figs. 164-8. A subordinate window between the main windows. The tendency is to abandon their use.

**Smith vacuum brake**. Figs. 289-92. A system of continuous brakes, invented and patented by Mr. J. Y. Smith, operated by exhausting the air from flexible india-rubber cylinders or bags, resembling the bellows of an accordion, which are placed under each car. One end of these cylinders is attached to the car-body and the other is connected by a rod to a system of brake-levers. When air is exhausted from the cylinder the pressure of the air on the outside of the movable head is communicated to the brake-levers and thence to the brake-shoes. The air is exhausted by an *ejector* on the engine, which is connected with the india-rubber cylinders by pipes and flexible hose between the cars.

**Smoke-bell**. **13**, figs. 827 $\frac{1}{2}$ , 843; **27**, figs. 630-1. A cover or screen of glass, porcelain or metal, shaped somewhat like a bell, and placed over a lamp to protect the ceiling of a car or room. Large smoke-bells are often called *canopies*, as **A**, figs. 841-2 (Harrison postal-car chandelier).



**Smoke-bell bracket.** 12, figs. 869, 941. A separate carrier for a smoke-bell.

**Smoke-bell stem** (of lamps). 29, figs. 827 $\frac{1}{2}$ -71. A tube attached to the upper part of a smoke-bell and serving to conduct away the gases so as to bring the smoke-bell lower and nearer to the lamp.

**Smoke-box** (Gouge heater). Fig. 1465; 30, figs. 1413-4; 13, figs. 1405-7. The part at the bottom of the heater connecting the long and short smoke-pipes.

**Smoke-collar** (Gouge heater). Fig. 1453. A cast-iron collar making an air-tight connection between the long smoke-pipe and the injector-pipe. There are two smoke-collars, *top and back*.

**Smoke connecting-joint** (Gouge heater). 78, fig. 1409. See above.

**Smoke-head** (Gouge heater). Fig. 1468. The equivalent of a *smoke-pipe*, which see.

**Smoke-jack.** See *Lamp-jack*. *Stove-pipe jack*.

**Smoke-pipe** (Gouge heater). 11 and 12, figs. 1405-7; 58 and 59, figs. 1413-4. Distinguished as *long* and *short*, the short smoke-pipe being for direct draft in the kindling of fires.

2. (Spear and other heaters.) 4, figs. 1486-7, 1502. The pipe by which the smoke is conducted to the outside of the car, usually called *stove-pipe*, but the stove-pipe of heaters is called a smoke-pipe to distinguish it from the air-pipes.

**Smoke-pipe cap** (Spear heater). 5, figs. 1486-9. A covering on top of the smoke-pipe to exclude rain and wind. Also called *jack*.

**Smoke-pipe casing** (Spear and other heaters). 8, fig. 1488; K, figs. 1484-5. An outside pipe which incloses a smoke-pipe, leaving a space between the two through which air is admitted from the top and is thus warmed. See also *Perforated smoke-pipe casing*.

**Smoke-pipe thimble** (Gouge heater). Fig. 1426. A rectangular tube passing through the roof of the car, forming an air-chamber through which the *smoke-pipe* passes.

**Smoke-top** (Baker heater). 12, fig. 1301; fig. 1313. The upper part of the heater, made of Russia iron, in a conical form.

**Smoking car.** A car usually attached to all passenger trains immediately behind the baggage car, in which smoking is permitted; also in general custom the only

one open to passengers with second-class tickets. *Buffet smoking-cars*, which see, and some others, are more luxurious.

**Smoking carriage** (English). A passenger vehicle in which smoking is allowed. The whole of a vehicle is seldom devoted to this purpose, separate compartments of each class being set apart for smoking in every train, as required by law. See also *Carriage*.

**Smoking-chair** (parlor cars). Fig. 1161. A chair distinguished from other parlor-car chairs chiefly in being less roomy and comfortable.

**Smoking-room** (sleeping cars). Figs. 210-12. A compartment now almost universal in modern sleeping cars and parlor cars. It is generally kept for the free use of the passengers, and separate seats or berths are not sold in it. See note to fig. 209.

**Smudge** (English). The scrapings and cleanings of paint pots collected and used to cover the outer side of the roof-boards as a bed for the *rooing canvas*, which see.

**Snatch-block.** Fig. 1888. Properly a single block which has an opening (*notch*) in one *cheek* to receive the rope. The snatch-block is usually provided with a *swivel-hook*. The term is also popularly applied to any form of single block provided with a hook, although more properly it applies to only one with an opening at the side for readily inserting or removing the rope.

**Snow body-bolster.** Figs. 221-3. See *Body-bolster*.

**Snow-flanger.** A bar of iron or steel attached to a car or engine to scrape away snow and ice on the sides of the heads of the rails so as to make room for the flanges of the wheels. Not much used.

**Snow-plow.** Figs. 74-81. "A machine operated like a plow but on a larger scale, for clearing away the snow from railroads."—*Webster*. The parts of a snow-plow corresponding with the plow-share and mould-board of an ordinary plow are mounted on running gear similar to that used for freight cars. Small snow-plows are also attached to the cow-catchers of locomotives and regularly carried throughout the winter.

The number of different types is great, but figs. 74 and 81 are the leading forms, fig. 81 being perhaps the more common type. Sometimes six or seven locomotives are attached behind them.

Another machine called the *rotary steam snow-shovel*, operating in a manner altogether different from ordinary snow-plows has recently been introduced. It has a powerful rotary *knife wheel*, 9 ft. in diameter, carrying four heavy steel knives

running at from two to three hundred revolutions per minute, slicing off the snow for a width of ten feet and depositing it on a rotating fan-wheel behind, revolving in a drum at the same rate of speed as the knife-wheel, which throws the snow through a shoot on the top of the drum, to some distance from the track. This machine carries its own flanger, cleaning the flange every time it passes over the road. The knife-wheel and shovels are driven by two stationary engines, with their own boiler, tank and coal-bunk complete, carried upon a separate car. The device is not yet in general use.

**Snow-scraper.** A, fig. 70. A plate or bar of iron or steel attached to an engine or car to scrape away the snow and ice from the rails.

**Snow's steel-tired car-wheel.** Figs. 2162-4. A form of wheel the distinguishing feature of which is the *independent hub*, so formed that the entire wheel can be removed when the tire needs re-turning, leaving the hub upon the axle. The other parts of the wheel are the *tire*, the *internal flange*, *back* and *front face-plates*, bolted to the tire and to the hub, and the *central filling-piece*, which constitutes the outer portion of the wheel-centre.

**Soap-dish.** Figs. 1579-80; 6, fig. 1570.

**Soap-holder.** Figs. 1570-8. A soap-dish attached to a partition like a bracket.

**Socket.** "Any hollow thing or place which receives and holds something else."—*Webster*. As the socket for water-cooler valve, fig. 1597.

See also *Berth-curtain rod*      *Revolving-chair stand*  
    *bushing, or socket.*      *socket.*  
    *Flag-holder socket.*

**Socket-caster.** Figs. 1147, etc. A fixed or rigid caster. Not properly a caster at all, except by custom of the trade. See *Caster*.

**Socket-washer.** Fig. 1878. A large washer with a cavity to receive the head or nut of a bolt or rod so that it will not project beyond the surface of the wood to which it is attached. Also called *cup-washer*.

**Socket-wrench** (Gouge heater). Fig. 1446. A tool for shaking and dumping the grate.

**Sofa** (sleeping cars). A longitudinal seat which makes up by pulling out sidewise so as to drop the back. Now used only in staterooms. Formerly sometimes used for all the berths in a sleeping car.

**Sofa-back** (Mann boudoir cars). B, figs. 680-1. The part which makes the upper berth.

**Sofa-bolt** (sleeping cars). Figs. 1241-2. A sliding bolt used for holding a sofa in its place. It is operated from

the front by a *sofa-pull* working through a *sofa-crank*. Sofas standing against the side of the cars are now little used, however.

**Sofa-caster.** Fig. 1146. See *Caster*.

**Sofa-hinge.** Fig. 1232. A hinge by which the seat and back of a sofa are fastened together so that they can be changed from a sofa into a bed. See *Seat-hinge*.

**Sofa-spring** (English). See *Seat sofa-spring*. *Back-squab sofa-spring*.

**Soffit-board.** 121, fig. 174. A board which forms the under side or ceiling of some subordinate part or member of a building or a car, as of a staircase or cornice. See *Deck soffit-board*.

**Soil-hopper.** Figs. 1090-6. See *Closet-hopper*.

**Sole-bar** (English). 1, figs. 116, 117, 205, 206. American equivalent, *outside sill*. One of two longitudinal bars which are the main members of the *underframe*, which see. In English car-construction the outside sills are relatively more important than in America, as will be seen in figs. 116-119.

**Sole-bar angle-iron** (English). 12, fig. 204. An angle-iron secured to the *sole-bar*, to stiffen it. A plate is sometimes used instead of an angle-iron.

**Solid-braided bell-cord.** Figs. 709-10. See *Bell-cord*.

**Solid-head coupling-pin.** Figs. 436-443. So called in distinction from an *eye-head* pin.

**Solid-head drawbar.** Fig. 452. A wrought-iron drawbar having the head and shank in one solid forging instead of being united by riveting, as in figs. 449-51.

**Solid-leather nails.** Figs. 1045½, 1230. A form of ornamental nail for finishing work, in which the head is of solid leather, the mode of attaching the metal pin to the same having been patented Oct. 18, 1881. The same principle is applied to the manufacture of *solid-leather buttons*, also much used for decorative purposes.

**Solid-nipple seat-arm.** Figs. 1169-74. A device for giving a larger bearing surface and more solid connection to the seat-arms. Patented by W. G. Creamer, and now almost universally used in principle even when the exact features of the patent are not followed.

**Solid wrought-iron single-spoke wheel** (English). 25, figs. 116-119. A wheel in which the spokes, hub (*boss*) and rim are all welded together, each spoke consisting of one single bar. The tire is shrunk on.



**Spacing-block.** 12, figs. 82-101. See *Body-bolster spacing-block*.

**Spanner.** A wrench for uncoupling hose, etc., formed like the arc of a circle, with notches or lugs for engaging into dogs or grooves on a spanner-nut. An ordinary wrench is termed a *spanner* in England. Hence—

**Spanner-nut** ("American" Steam brake-valve). 4, figs. 360-2. (Eames ejector.) 10, figs. 282-8. A nut with many sides like a hose-coupling, so as to approximate more closely to a circular form, and commonly provided with lugs or vertical grooves cut in its circumference for engaging with a *spanner*. The *piston-rod packing-nuts* of Westinghouse air-pump are of this pattern.

**Spear anti-clinker car-heaters.** Heaters or stoves manufactured by Mr. James Spear, of Philadelphia, for heating cars, and made with a sheet-iron outside casing which leaves an air-space between the stove and casing, into which a current of air is admitted, and is warmed by coming in contact with the stove, and then escapes into the car. Several different patterns of these heaters are made, designated by the manufacturers as patterns *A*, *B*, *C*, and *D*, and represented by figs. 1486-1528. In fig. 1486, or pattern *A*, the cold air is admitted through a hood 1, 1, on top of the car, and is carried down to the bottom of the stove by a pipe 2, 2, and then circulates around the pipe, as shown by the darts in the section, fig. 1490, and enters the car through a hot-air pipe 3, figs. 1486, 1490, which extends the whole length of the car, with registers at each seat. In pattern *B*, fig. 1487, the hot-air pipe is not used, the warmed air escaping directly into the car through openings in the base of the stove. In pattern *C*, fig. 1488, an independent cold-air pipe is not used, but the smoke-pipe is inclosed in a casing, with a space between the two, through which the cold air descends and passes over the stove and escapes at the base, as shown by the darts. In pattern *D*, fig. 1489, no hood is used on top of the car, but the cold air enters the air-space from the inside of the car at the base of the stove and escapes at the top, as shown by the darts.

The "anti-clinker" feature of these heaters consists in a peculiarly-arranged grate, shown in the section, fig. 1490, with an annular opening between it and the base of the stove, through which the clinkers can be removed from the grate.

**Spear's draft regulator.** Figs. 1491-2. A device by which an air inlet is opened in the smoke-pipe in such manner that the draft is checked but no gas is permitted to escape, the current being entirely inward.

**Spider.** See *Centre brake-lever spider*. *Tank waste-cock spider*.

**Spider-plate, or underframe plate** (English). 16, figs. 116-119 and 204-207. A flat horizontal wrought-iron bar connecting two or more timbers of the *underframe* together, and being placed beneath them prevents one sinking below the others. It is often made with three or more arms radiating from a common centre; hence its name. The form shown is a plainer form.

**Spindle.** Fig. 999; *B*, figs. 1003-4, etc. See *Door-latch spindle*.

**Spindle, or bolt drawbar.** Fig. 449. See *Drawbar*.

**Spiral-elliptic seat-spring.** Fig. 1226. A spring made of a thin band of steel wound in a spiral coil, the transverse section of which is elliptical.

**Spiral sash-spring.** Fig. 1650. See *Sash-spring*.

**Spiral seat-spring.** Figs. 1227-9. The common form of seat-spring, which see.

**Spiral spring.** Figs. 2049-94. (Graduated spiral springs, figs. 2095-2106). A spring made of a metal rod or bar coiled in the form of the thread of a screw so that it can be compressed or expanded in the direction of the axis around which it is coiled. Most of the springs now in use in car work, except the bolster-springs of passenger cars, are spiral springs. *Volute* springs, *india-rubber* springs, *compound* or *wool-packed* springs (which latter are spiral-springs reinforced by rubber or wool), have almost fallen out of use. Spiral springs are designated as *single*, *double*, *triple*, or *quadruple-coil* springs when nested one inside the other. Such springs are hence also called *nest-springs*. Usually, the single springs or nest-springs are again combined into *two-group*, *four-group*, *six-group*, etc., springs, up to as high as eleven-group. Two to eight-group springs are the most common. *Graduated-springs*, which see, are a recent introduction, and are in wide and general use. The various springs in them come into action successively as the load increases instead of all at once. Spiral springs are also designated according to the section of bar as *round-bar*, *flat-bar*, *square-bar*, *half-round-bar*, *oval-bar*, *edge-rolled*, etc. *Equal-bar* is a term applied

to nest-springs made from bars of such size that the resistance of the coil is proportioned to its diameter. Spiral springs are also designated according to their use as *equalizer-springs*, *journal-springs*, *pedestal-springs*, *bolster springs* (which latter are the main springs of a car), *buffer-springs*, *draw-springs*, etc.

**Spiral-spring cap.** 4, figs. 2095-6, 2044, 2045, 2095-2106, 2047, 2073-88. A casting or plate which forms a bearing for the top of a spiral spring, and which also holds it in its place. A *seat* is used at the other end, but both these parts in bolster-springs are commonly called *spring-plates*, which see.

**Spi-al-spring seat.** See above.

**Spittoon.** Fig. 808. A vessel to receive discharges of spittle and other abominations. A *cuspidor*, which see, is the same thing in a different form.

**Splash-board.** 49, figs. 169-83. A board attached in an inclined position covering up the back of passenger-car steps. It serves much the same purpose as the *risers* of steps, and prevents mud and dirt being thrown on the steps.

**Splasher (English).** 188, figs. 204-6. An iron plate attached to the floor above the wheels. Only used when the wheels are too large in diameter to clear the ordinary floor. Also called *wheel-cover* or *wheel-plate*.

**Splice.** 1. "The union of ropes by interweaving the strands."—*Webster*. Hence any appliance by which the ends of a rope, cord, beam or bar, are united. See *Bell-cord splice*.

2. (For car-sills.) See *Scarf-joint*. *Ship-splice*. According to the rules for the interchange of cars of the Master Car-Builders' Association, the splice of a sill to be received must be 24 in. long and arranged as shown in fig. 651.

**Split-key.** 17, 18, figs. 363-5, etc. A form of pin which is self-fastening, consisting essentially of two parallel strips or bars of metal which when united constitute one pin, but which tend to spring apart, so that the pin cannot be withdrawn without the use of considerable force.

**Split-ring (for lamp).** Fig. 830. An adjustable ring to carry a lamp-shade, permitting of a variation of diameter. See *Lamp-shade*.

**Spoke.** "One of the radial arms which connect the hub with the rim of a wheel."—*Knight*.

**Spoke-wheel.** Figs. 2126-65. A wheel the rim or tire of which is connected with the hub by spokes instead of

one or more plates. These spokes are sometimes made of solid cast-iron, in others they are cast hollow, and in still others are made of wrought-iron. See *Hollow-spoke wheel*, figs. 2127-9. *Hand-car wheel*, figs. 1724-6. *Wrought-iron* (Kirtley's double-spoke) *wheel*, figs. 2162-5.

**Spool (of hoisting-gear).** 41, figs. 1821-4. The drums on which the hoisting-rope or chain is wound.

**Spool-shaped spiral-spring.** Fig. 2051. This form was patented by W. P. Hansell in 1874-5. Its object is to obtain a *graduated* spring, which see.

**Spring.** Figs. 2031-2106, etc. (*Elliptic* springs, figs. 2031-2041; *rubber*, etc., springs, figs. 2042-8; *spiral* springs, figs. 2049-2094; and *spiral graduated* springs, figs. 2095-2106). An elastic body to resist concussion. Springs are also used to produce motion in a reverse direction to that caused by some other applied force, as a brake-spring and the spring of a door latch. The leading forms of springs are *elliptic* springs and *spiral* springs, which see. Modifications are the *spiral-elliptic* and the *half-elliptic* springs. *Volute* and *india-rubber*, or *gum* springs are little used. Spiral springs are designated according to the number combined together one within the other, as *double-coil*, *triple-coil*, etc., or if the springs are placed side by side, as *two-group*, *four-group*, *six-group*, etc.; elliptic springs, according to the number united to work together as one spring, are designated as *double* or *duplicate*, *triple* or *triplicate*, *quadruple*, *quintuple*, and *sextuple*. The main springs about a car are nearly all spiral springs, except that elliptic springs are almost exclusively used for the bolster-springs of passenger cars. The minor springs, designated in name by the purpose which they serve, are the following, which see:

<i>Back-spring.</i>	<i>Lateral-motion spring.</i>
<i>Berth-spring.</i>	<i>Mirror-frame spring.</i>
<i>Brake-hose coupling-valve spring.</i>	<i>Release-spring.</i>
<i>Candle-spring.</i>	<i>Safety-grate spring.</i>
<i>Coupling-spring.</i>	<i>Sash spring.</i>
<i>Double release-spring.</i>	<i>Sash-lock spring.</i>
<i>Double sash-spring.</i>	<i>Seat-latch spring.</i>
<i>Door-latch spring.</i>	<i>Seat-lock spring.</i>
<i>Door-lock-bolt spring.</i>	<i>Seat-spring.</i>
<i>Door-spring.</i>	<i>Spiral seat spring.</i>
<i>Graduating spring.</i>	<i>Spiral sash-spring.</i>
<i>Journal-box-cover-spring.</i>	<i>Swing-bolster spring.</i>
	<i>Window-blind spring.</i>

The principal springs of a car supporting its weight are the *bolster-springs*, also called *bearing-springs* or *body-*



*springs*. *Equalizing-bar* or *equalizer* springs are used in addition on passenger cars, as also sometimes *journal* springs. *Side journal-springs* are used on street cars and are sometimes *keg-shaped* or *spool-shaped*, which see. Tension is communicated through the *draw spring*. A separate *buffer-spring* or *auxiliary buffer-spring*, which see, is sometimes used. See also *Set of springs*.

In European practice *bearing-springs* are semi-elliptical; *buffing* and *draft springs* rubber, semi-elliptical, spiral or volute. The seat-cushions and backs are supported by *sofa-springs*.

**Spring-band** (elliptic springs). 1, figs. 2031-41. A wrought-iron strap which embraces the plates at the centre.

**Spring-beam** (six-wheel trucks). 42, figs. 1969-70. A transverse timber which rests on top of the *holster-springs*. There are two such to each truck, on which the *bolster-bridges* which support the *bolster* rest. It is sometimes of iron, as **B**, figs. 1971-3.

**Spring-block**. 76, figs. 1957, 1967. A piece of wood used as a distance-piece above or below a spring.

**Spring-box** (Westinghouse pump governor, which see). 5, fig. 316.

**Spring-burner**. Figs. 894, etc. A lamp-burner to which the chimney is fastened by a spring.

**Spring-cap**. A cup-shaped piece of cast or wrought iron for holding the top of a spring and against which the latter bears. They are further distinguished by the name of the spring, as *bolster-spring cap*, etc. The *spring-seat* comes below the spring, but both these parts are very commonly called *spring-plates*, especially in large *group-springs*.

**Spring-case**. Fig. 2047. A cast-iron box made in two parts to hold one or more spiral or india-rubber springs. Such springs are nearly obsolete.

**Spring-catch** (for ash-pit door, Kobler stove). **E**, fig. 1473. (For feed-door.) **J**, fig. 1474.

**Spring collar** (Barnard door-holder). Fig. 777. A peculiar spring washer made of tempered wire carried in the floor-stop, with which the door-holder engages in such manner as to be easily detached.

**Spring door-latch**. Figs. 989, 1023-4. A latch, the bolt of which is thrown into contact with a catch by a spring and is disengaged by a knob or handle. Such latches

are not arranged so as to be fastened with a key. See *Latch*.

**Spring door-lock**. Fig. 995. A lock usually called a *night-latch*. See *Latch*.

**Spring door-stop**. Figs. 768-71. See *Door-stop*.

**Spring draw-clevis** (street cars). One which can slide longitudinally, and whose movement is resisted by a spring.

**Spring draw-hook** (street cars). One which can slide longitudinally, and whose movement is resisted by a spring, so as to give it elasticity when subjected to tension.

**Spring-edge** (car upholstery). Figs. 1205-8-12-13. A term applied to a method of upholstery which protects the frame-work entirely by springs, so that it is not felt by the occupant of the seat.

**Spring end-sill**. A long bar of some tough, elastic wood used in certain narrow-gauge and other cheap cars as a substitute for a draw-spring. It is bolted to the end-sills at its ends only, and having a cast-iron draw-head bolted to its middle. The natural spring of the wood then becomes a partial and cheaper substitute for a draw-spring.

**Spring-hanger**. 1. (Elliptic springs.) 170, fig. 102; 102, fig. 1959. A T-shaped bolt or U-shaped iron strap which sustains the end of a semi-elliptic spring. The *T-hanger* is a bolt with a T-head passing through a slot in the spring, used in locomotives, but not on cars. The *U-hanger* is a strap which passes over the end of the spring without requiring any perforations of the plates, as at 170, fig. 102.

2. (English.) See *Scroll-iron*. *End scroll-iron*. *Spring-link*.

**Spring-hanger iron** (caboose, etc.). 171, fig. 102. A bent bar fastened to a pedestal timber or wheel-piece, to which the spring-hangers are attached.

**Spring-hinge**. Figs. 785-8. See *Double-acting spring-hinge*.

**Spring-link adjusting-screw**, or *tee-bolt* (English). 85, fig. 205. An eye-bolt by which the tension of the bearing-spring and, to some extent, the height of the car-body above the rails can be regulated. Rarely used except in passenger service, where it is very general. A different style, having the bolt vertical, is shown at 86, fig. 205, is the same as above, except that

being vertical, it cannot put initial tension on the spring.

**Spring-lock.** 1. (For feed-door, Kohler stove.) **G**, fig. 1474.

2. (Bissell stove.) Figs. 1374, 1396.

**Spring-lock handle** (Bissell stove). Figs. 1376, 1388.

**Spring-padlock.** Figs. 1029-37. A padlock, the hasp of which can be locked by pressure only, without a key; so called in distinction from a *dead* padlock.

**Spring-pin.** 41, figs. 1955-73. See *Lateral-motion spring-pin* (passenger-car trucks).

**Spring-pivot** (deck-sash, which see). Fig. 1642.

**Spring-plank.** 43, figs. 1907-69. A transverse timber underneath a truck-bolster and on which the bolster-springs rest. Also called *sand-plank* or *sand-board*. A *spring-plank safety-strap* or guard, which see, passes under the spring-plank. In iron trucks, iron *spring-plank bars* take the place of the wooden spring-plank, as **S**, figs. 1971-3. Large spring-planks are sometimes *framed*, and so called, as fig. 2029. A *swing spring-plank* is used in passenger and other *swing-motion* (which see) trucks. In rigid-bolster trucks the spring-plank is bolted to the lower arch-bar of the truck-frame. Some exceptional trucks, as figs. 1942-4, 1948-50, have no spring-plank nor bolster-springs.

**Spring-plank bars** (iron 6-wheel truck). **S**, figs. 1971-1973. See above.

**Spring-plank bearing.** 44, figs. 1912-66. A casting on which a spring-plank rests, and which is supported by the lower swing-hanger pivot. Also called *cross-bar casting* or *spring-plank carrier*, figs. 2110-11.

**Spring-plank carrier, or cross-bar casting** (swing link-hanger). 3, figs. 2110-1. See above.

**Spring-plank safety-strap** (passenger-car trucks). 45, figs. 1955-67. A U-shaped strap of iron attached to the transoms, and passing under the spring-plank, so as to hold it up in case the swing-hangers or their attachments should break.

**Spring-plank timber** (framed spring-plank). Fig. 2029. A timber forming one of the sides.

**Spring-plate.** Figs. 2094, 2096-7, etc. A common term for *spring-seats* and *caps*, especially those of considerable size, as for bolster-springs. They are often provided with *spring-plate lugs* to hold the spring in place.

**Spring-plate lugs** (bolster-spring). 5, figs. 2095-6. See above.

**Spring-pocket** (strap drawbar). 1, fig. 450. See below.

**Spring-pocket, or strap, drawbar.** Figs. 387-9, 450-2. A drawbar with a rectangular strap or "pocket" at the back end in which the draw-spring is placed. So called in distinction from a *bolt* or *spindle drawbar*.

**Spring-saddle.** 1. (Iron passenger-car trucks.) 103, fig. 1959. A  $\cap$ -shaped bar of wrought-iron, which is placed on top of a journal-box surrounding the arch bar and on which a spring rests.

2. (Street cars.) 7, fig. 1843. A similar part having projecting ledges (*spring-shelf*) on each side, on which the springs rest.

**Spring sash-holder.** Fig. 1651. A little-used device for holding up sashes.

**Spring-seat.** Figs. 2067-2106. A cup-shaped piece of cast or wrought iron on which the bottom of a spring rests. See *Spring-cap*. *Spring-plate*.

They are further distinguished by the name of the spring for which they serve, as *bolster-spring seat*, *equalizer-spring seat*, etc.

**Spring-shackle** (English). See *Spring-link*.

**Spring-shelf.** See *Spring-saddle*.

**Spring-stud** (street cars). A round iron bar which rests on the top of the journal-box or spring-seat and passes through the centre of a spiral or rubber spring. The upper end works in a guide and thus holds the spring in its place. A similar bar has been used on steam-cars for transmitting the weight from the spring to the journal-box.

**Spring-toggle driver-brake.** One of the four styles of driving-wheel brake-gear manufactured by the American Brake Co. It differs from the general plan of the *bell-crank* driver-brake, figs. 363-5, chiefly in the interposition of a spiral spring between the brake-shoe and the toggle-joint by which the power is applied, in order to equalize the pressure.

**Spring-yoke.** A *spring-saddle*, which see.

**Sprue** (foundry). The piece of metal which fills the *gate* or channel through which the metal is poured in making a casting. This piece is broken off when the casting is cooled. The gate itself is often called a sprue.

**Sprue-hole.** A *gate* of a mould for casting metals.

**Spur-wheel** (hoisting-gear, etc.). 9, figs. 77-8; **G**, fig. 145. Literally any cog-wheel, but usually meaning the larger



one of a pair of wheels in gear, in distinction from the *pinion*, which is the smaller one of the two.

2. (Lever hand-car.) 9, figs. 1734-6.

3. (Slewing-gear of pile-driver car, which see.) 49, figs. 1821-4.

**Squab-cushion.** One formed of a bag or case stuffed with curled hair or other elastic material, not attached to the seat, but simply laid upon it. Now little used, *box-cushions* being preferred. See *Cushion*.

**Square-bar spiral-spring.** Figs. 2049, 2064½. See *Spiral spring*.

**Square door-bolt.** Fig. 758. A door-bolt made of a square and straight bar of metal. When the bolt has an off-set it is termed a *square-neck door-bolt*, as in fig. 759.

**Square-end.** 4, fig. 109, etc. A rectangular piece on the end of a shaft to which a crank or wrench can be applied; also termed *winding-arbor* or *crank-pin*.

**Square-lantern.** Figs. 908, 961. A form having glass on three sides, used chiefly for fixed lights.

**Square-root iron.** A term applied by manufacturers to angle iron in which the corners are brought to a sharp angle and not rounded off. Thus: L. Square-root iron is one form of angle-iron, but is never meant when that term alone is used.

**Stake** (flat or platform cars). 1, fig. 14; 198, figs. 113-5. A stick of wood attached outside the sills by a *stake-pocket* or *stake-pocket strap* and *stake-bolt*, which see, to keep the load from falling off. They are sometimes attached by a mere swiveling bolt, so that they can be dropped down horizontal, if desired.

**Stake-bolt** (gondola and platform cars). 200, fig. 115. A bolt passing through the end of the stakes, serving in connection with the *stake-pocket strap*, which see, in place of the ordinary form of stake-pocket. figs. 652-3.

**Stake-hook** (platform cars). 3, fig. 14. A hook on the side of a platform car to hold a swiveling stake in an upright position.

**Stake-pocket** (gondola and platform cars). Figs. 13, 15, 652-3. 1767. A cast-iron receptacle attached to the side-sills to receive the end of a stake. A substitute is the *stake-pocket strap*, which see.

**Stake-pocket strap**, or U-bolt (gondola, platform and stock cars). 2, fig. 652; 199, fig. 115. A U-shaped bolt flattened at the side, and serving in connection with the *stake-bolt* as a substitute for the ordinary form of stake-

pocket, when the stakes are intended as permanent attachments.

**Stake-pocket U-bolt.** 2, fig. 652, etc. See above.

**Stake-rest** (flat cars). 2, fig. 14. A bracket or support on which a stake rests when turned down horizontally.

**Stake sleeve** (flat or gondola cars). 2, fig. 653. A casting with a horn-shaped projection slipped over a stake to hold up the linged side of a platform or gondola car.

**Stanchion.** 1. A prop or support.

2. (Nautical.) A term very generally but not exclusively used, for posts with an eye in one end which carries a rope.

3. (Car and locomotive work.) Fig. 1040; 3, fig. 382, etc. By analogy from nautical use, a metal post or hanger with an eye in one end, which holds a rod or other object, as a hand-rail or curtain-rod. The opposite end is usually fastened by a nut, or with a flange or lugs which form a part of the stanchion. Also see *Window-curtain-rod stanchion*, fig. 1693.

**Stand.** "Something on which a thing rests or is laid."—*Webster*.

See *Radiator-stand*.

*Revolving-chair stand*.

*Seat-stand*.

*Water-cooler stand*.

**Standard.** 1. Fig. 1735. A name sometimes applied to the *column* or *bolster guide-bar*, which see.

2. (For cross-bar of Creamer-brake, which see.) 14, fig. 263.

3. (Of M. C. B. Association.) A considerable list of standard details of cars, given separately below and jointly under *Master Car-Builders' Association*, which see, has already been adopted.

**Standard automatic ventilator.** Fig. 1568. A device having a door which is caused to swing open automatically by the force of the exterior air into a position to cause an exhaust draft.

**Standard axles** (M. C. B.). Figs. 1974-5.

**Standard bolts and nuts** (table). Fig. 1834. See *Sellers standard*.

**Standard brake-shaft attachments** (M. C. B.). Figs. 656-7.

**Standard brake-shoe and head.** Figs. 1977-9. A widely used form of attachment, patented Sept. 5, 1882, the peculiarity of which is the use of a dove-tailed joint and the fact that the shoe is reversible. The weight of the shoe, 1½ in. thick, is about 20 lbs. and of the head about

10 lbs. The shoe is held in position at the bottom by a *split-key*.

**Standard car-axle** (M. C. B.). Figs. 1874-5.

**Standard cast-iron drawbars.** Figs. 453-535. A collection of drawbars which are carried in stock for repairing purposes on the New York, Lake Erie & Western Railroad, in all probably including from one-fourth to one-fifth of the important existing variations.

**Standard dead-blocks and height of drawbar** (M. C. B.). Figs. 405-8.

**Standard distance-gauge between backs of flanges** (M. C. B.). Fig. 1996.

**Standard draw-gear attachments** (M. C. B.). Figs. 401-404.

**Standard gauge.** The most common distance between the rails of railroads, which is throughout the world 4 ft. 8½ in. See *Gauge*. This gauge originated from the use of an even 5 ft. gauge *with outside flanges*. As inside flanges came to be preferred, and had to run on the same rails (then with much narrower heads than now) the present standard was of necessity used.

**Standard journal-bearing and key** (M. C. B.). Figs. 1984-92.

**Standard journal-box** (M. C. B.). Figs. 1997-2001.

**Standard ladder and grab-iron attachments** (M. C. B.). Figs. 656-7.

**Standard lamp-chimneys.** Figs. 926-36. See table of standard dimensions under *lamp-chimneys*.

**Standard lamp-shades.** Figs. 942-8. See *Lamp-shade*.

**Standard lettering for line cars** (M. C. B.). Figs. 658-9.

**Standard limit-gauge for round iron** (M. C. B.). Figs. 1825-6.

**Standard pedestal** (M. C. B.). Figs. 2021-4.

**Standard screw-threads** (M. C. B.). Fig. 1829. See also *Sellers and Whitworth*.

**Standard splice** (M. C. B.). Fig. 651. This is practically but not formally one of the M. C. B. standards. See *Interchange of traffic*.

**Standard wheel and axle gauges** (M. C. B.). Figs. 2114-2123.

**Standing, intermediate or partition pillar** (English). 95, figs. 204-207. American equivalent, *post*. An upright piece in the body running its entire height. The term is not applied to the corner or *doorway pillars*, which see.

**Staple.** A U-shaped piece of wrought-iron pointed at the ends, to be driven into wood to hold a hasp, hook, pin, etc.

**Stationary-lock** (freight cars). Figs. 1014, 1017, etc. A lock permanently fixed to the door or side of the car, in distinction from padlocks, which are as yet the most commonly used.

**Stay.** A beam, bar, rod, etc., by which two or more objects are connected together to prevent lateral deviation of one or both of them.

See *Body queen-post stay*.

*Centre-stay.*

*Lamp-stay.*

*Pipe-stay.*

*Sill-step stay.*

**Stay-rod.** A rod which acts as a stay. See *Pedestal stay-rod*, 7, figs. 955-73.

2. (Of a derrick or crane.) 7, figs. 77-78; J, fig. 145;

D<sub>3</sub>, figs. 151-3. See *Tension-rods*.

**Steam brake-valve** (American Brake Co.). Figs. 360-2. A part corresponding to the *engineer's brake-valve* of the Westinghouse brake, by which the admission of steam to the brake-gear is controlled.

**Steam-car.** A term used to designate ordinary railroad cars when it is desired to distinguish them from *street cars*.

**Steam-cylinder** (Westinghouse brake). 3, figs. 293-9; figs. 294, etc. The admission of steam to this cylinder is controlled by the *reversing-piston* and *reversing-valve*, which operate the *main steam-valves*. See *Cylinder*.

**Steam-cylinder gasket** (*upper and lower*, of Westinghouse air-pump, etc.). 36 and 37, fig. 298, and 40-1, fig. 299. See *Gasket*.

**Steam-cylinder head** (Westinghouse brake). 2, figs. 298-9. A cover for the top of the steam-cylinder.

**Steam-pipe.** 1. (Engine of Westinghouse brake.) 6, fig. 298; 14 and 35, figs. 298-9. The steam supply-pipe to the steam-cylinder.

2. (Westinghouse pump-governor.) A, fig. 316.

**Steam-pipe swivel** (Westinghouse pump-governor). 11, fig. 316.

**Steam-pipe union** (Westinghouse air-pump, etc.). 14, fig. 298. A *pipe-coupling*, which is often called a *union*.

**Steam-piston** (engine of Westinghouse brake). 10, fig. 298; 7, fig. 299. See *Piston*.

**Steam-piston packing ring** (Westinghouse air-pump) 12, fig. 298; 9, fig. 299. See *Piston*.



**Steam tender-brake** (American Brake Co.'s brake-gear). Figs. 366-7. The brake-cylinder contains within it a *piston* 2, almost completely filling it, leaving only a small annular space within which live steam is admitted, so that the loss by condensation may be as small as possible.

**Steam-valve, or main steam-valve** (Westinghouse brake). 18, fig. 311: figs. 294, 298-9, etc. A peculiar device for controlling the admission of steam to the steam-cylinder of the engines and air-pump, by means of the *reversing-piston*, which see, working in the *reversing-cylinder*. The *upper* and *lower* steam-valves are of different diameters and connected by a fixed rod. See *Main steam-valve*.

**Steam-valve bushing** (Westinghouse brake). See above and *upper and lower steam-valve bushing*.

**Steeled-wheel** (Hamilton's, which see). A cast-iron chilled wheel to which a proportion of steel has been added.

**Steel tired wheel**. Figs. 2146-2180. A wheel with a steel tire. In the *Sax & Kear* wheel, which see, the tire is welded to the body or centre of the wheel, which is made of cast iron. The term, unless otherwise stated, however, always means that the tire is either bolted or shrunk on.

Steel-tired or iron-tired wheels have been long in use in Europe, but have only recently been introduced into this country. The general form shown in figs. 215-8 is that which English experience has settled on as the best, and it is in almost universal use on English passenger cars. The form shown in figs. 2162-5 is rapidly tending to become the English standard for freight service. See *Mansell retaining-ring and tire-fastening*, figs. 2152-8. See also *Allen paper-wheel*, *Atwood hemp-packed wheel*, *Lindsay steel-tired wheel*, *Paige steel-tired wheel*, *Snow's interchangeable-hub wheel*, *Thomas steel-tired wheel*, *Wheel*, *Car-wheel*, etc.

**Steel-wheel**. Figs. 2148-9. A wheel which is made wholly of cast steel. Rarely used.

**Stem**. See *Buffer-stem*, *Graduating-stem*, *Reversing-valve stem*, *Smoke-bell stem*. The rod to which a valve of any kind is attached is always called a *stem*.

**Step**. 1. A ledge on a stair or round or rung of a ladder.

2. A foot-piece for ascending to or descending from a car or for standing in certain places or positions. *Pas-*

*senger-car steps*, figs. 686, etc., are from their locality called *platform-steps*, or from their material *box-steps*. On street cars only a single step is used, called the *side-step*. See also (street cars) *enclosed-step*, *longitudinal-step* or (English) *foot-board*. In freight cars a U-shaped iron called the *sill-step*, which see, figs. 656-7, is used (M. C. B. standard dimension,  $\frac{1}{2}$  by  $1\frac{1}{2}$  in. iron), and a kind of platform on the roof, called the *roof-step*. A small ledge on the end of a freight car near the top for a brakeman to stand on when applying brakes called the *brake-step*, is also used, but has been condemned by vote of the Master Car-Builders' Association. A bracket called a *tank-step* is attached to the tanks of tank-cars. Steps in stairs are connected by vertical *risers*.

**Step hand-rail** (street cars). 2, figs. 1840. See *Hand-rail*.

**Step-hanger**. 48, figs. 155-85. A vertical wrought-iron bar by which the steps are supported from the corner of a car and from the platform-timber.

**Step-iron** (platform steps). 47, figs. 155-85. A flat iron bar bent to conform to the shape of the steps and their risers and to which they are fastened. It is bolted at the upper end to the platform-sill.

2. (English.) 173, figs. 205-7. Also called *leg-iron*.

A wrought-iron forging attached to the *sole-bar*, and supporting the upper and lower *foot-boards*, which see.

**Step-ladder box** (Mann boudoir cars). H, figs. 630-1. A compartment under the seats for holding a step-ladder which is provided for each boudoir for ascending to the upper berth.

**Step-riser**. 5, fig. 686. The vertical portion of a step in stairs.

**Stevens brake**. Fig. 232. An arrangement of brake-levers patented by F. A. Stevens, 1852, by which the pressure is equalized on all wheels. It consists of two levers on each truck, the short arms of which are connected together by a rod in the usual way. The long arm on one of these, on each truck, is connected by a rod and chain with the brake-shaft, and the long arms of the other two are connected together by a rod so that the brakes can be applied from either end of the car.

**Stile**. 8, fig. 370, etc. The upright pieces on the outer edge of a door or sash, as *door-stile*, *sash-stile*, *window-blind stile*, etc.

**Stirrup**. 1. A kind of ring or bent bar of iron resembling somewhat the stirrup of a saddle. A drawbar carry-

iron, 9, figs. 383-400, is sometimes called a *stirrup*, as below.

2. (Cowell platform and coupler.) 9, fig. 540. A stirrup-shaped iron, sometimes called a carry-iron, which supports the drawbar in place. It is cast with a pocket for inclosing the *drawbar side-spring*, 17, which latter gives the coupler the necessary lateral motion. It takes the place of the Miller *leaf-spring* or *coupling-spring*.

3. (Janney coupler.) 108, figs. 542-53. A drawbar carry-iron.

4. (Janney-Miller coupler.) 51, figs. 554, 555-601.

**Stirrup block** (Miller platform). 30, figs. 636-7. A block attached to one of the centre-sills next to the platform end-timber, to receive the bolts which hold the *drawbar carry-iron*.

**Stitched roll** (upholstery). The finish for seams of car-seats. *Felt-edge*, which see, fig. 1225, is used as a substitute.

**Stock car**. Figs 5-9, 33-4, 132-8. A car made for transporting live stock, usually having a tight roof, but open grating sides and ends. Certain little used varieties called *box stock-cars*, figs. 8-9, have only large grated ventilators. *Double-deck* stock cars are built for the carrying of sheep and hogs, and nearly all modern stock cars are so designed that they can be used as double-deck cars if desired. In order to prevent suffering and injury to stock when carried in the common form of stock cars, various designs known as *palace stock-cars* (which see, for list) have been designed and to some extent used, but none of these are as yet in general use.

**Stop** (Janney-Miller coupler). 43, figs. 554, 555-601. The guard used to prevent the Miller hook from uncoupling by reason of lateral motion of cars.

2. (Miller coupler.) 13, figs. 636, 638-40. A casting attached to the platform end-timbers of a car to limit the lateral movement of the hook on the adjoining car.

3. Anything which prevents or limits movement; usually called by the name of the object which it stops, as the following, which see.

*Berth-stop*

*Brake-lever stop.*

*Blind-stop.*

*Centre-stop.*

*Closed-door stop.*

*Deck-sash stop.*

*Door-stop.*

*Outside window-stop.*

*Partition-stop.*

*Sash-lock lower-stop.*

*Sash-lock stop.*

*Sash-lock upper-stop.*

*Sash-stop.*

*Seat-arm stop.*

*Drawbar stop.*

*Draw-spring stop.*

*Floor-stop.*

*Inside window-stop.*

*Open-door stop.*

*Seat-stop.*

*Side-stop.*

*Spring-door stop.*

*Ventilator-stop.*

*Window-blind stop.*

**Stop-bar** (emigrant sleeping-car). Fig. 685. A bar to connect the two seats on which the seat-bottoms may rest when drawn down to make up into beds. It rests upon a *stop-bar plate*, fig. 1294.

**Stop-bar guide**. Fig. 1296. An attachment to hold a *stop-bar* in place laterally.

**Stop-bar hinge**. A, figs. 632-5. The hinge which enables the *stop-bar* to swing horizontally.

**Stop-bar plate**. Figs. 632-5, 1294. See *Stop-bar*.

**Stop-bead, or parting-strip**. 16, figs. 692-694. More properly *sash parting-strip*. The strip dividing the groove for the window-sash and the groove for the blind.

**Stop-bolt** (of car-door lock). G, fig. 1005. An attachment for throwing a door-latch out of gear.

**Stop-brace** (Miller coupler). 14, figs. 636-40. An iron bar attached to the draw-timbers and to the lower end of a *stop* as a brace for the latter.

**Stop-cock** (for brake-pipe of Westinghouse brake). 16, fig. 311; fig. 233; 25, fig. 325. A faucet attached to the brake-pipe of a Westinghouse automatic brake so that the pipe can be closed if the brake-hose are to be uncoupled. If the compressed air were allowed to escape from the brake-pipe, the brakes would be applied.

**Stop journal-bearing**. Fig. 2004. One with a lug or projection which bears against the end of the axle to restrain lateral motion and thus dispense with a collar.

**Stop-key**. See below and *journal-bearing stop-key*.

**Stop-key journal-bearing**. Figs. 2006-9. Similar to a *stop journal-bearing*, except that the stop is carried on the journal-bearing key or wedge.

**Stop-latch**. Figs. 995-1010. A spring door-latch with a *stop-bolt* by which the latch can be fastened on one side so as not to act. Also see *Saloon stop-latch*.

**Stop-pin** (American automatic compression brake). 29, figs. 368-9. The pins passing through the *governor-blocks*, by which the latter act upon the *disk*.

**Stop-plate** (for journal-box). 3, figs. 2005, 2008-9. A metal plate which forms an end-bearing for the axle and checks its end-motion. It is held in position either by flanges cast in the box, or by attaching it to the journal-



bearing or its key. Its object is to dispense with a collar. In very limited use.

**Stop-wedge.** A *stop-key*. See *Stop-key journal-bearing*.

**Stove.** 128, figs. 169-177; figs. 1473-83; also, generally, figs. 1300-1537. An apparatus made usually of iron, variously constructed, in which a fire is made for warming a room, house or car by direct radiation. When the warming is effected by convection, as with warm air, hot water, etc., the entire apparatus is called a *heater*. Stoves are rapidly passing out of use for heating passenger cars, but *cast-iron* or *egg-shaped* stoves are largely used for freight service. *Cook-stoves*, fig. 1483, are largely used for heating emigrant cars.

A cook-stove permanently fixed against the side of a room and directly connected with the chimney without the use of stove-pipe, is called a *range*; used in dining cars, etc., figs. 1480-2.

See *Chilson stove*. *Egg shaped stove*.  
*Cylindrical stove*. *Spear stove*.  
*Winslow car-stove*.

**Stove-leg (Johnson heater).** 1, fig. 1472. Stove-legs have usually a beveled tongue fitting into a socket so as to be easily removable.

**Stove-pipe.** N, figs. 1484-5, etc. A tube, usually of sheet-iron, for conveying the smoke from a stove or heater and creating a draft. In heaters, commonly called *smoke-pipe*, which see.

**Stove-pipe cap.** Fig. 1528. A U-shaped piece of sheet-iron fastened to the top of a stove-pipe, serving as a rough form of *jack*, which see.

**Stove-pipe damper.** A circular disk in the stove-pipe for regulating the draft.

**Stove-pipe jack.** 129, fig. 158; 5, figs. 1486-9. A covering or bonnet for the aperture of a stove-pipe on the outside of a car. The term usually means a more elaborate structure than a *stove-pipe cap*.

**Stove-pipe ring.** Figs. 1477, 1525. A metal plate or ring attached to the ceiling of a passenger car around the opening through which the stove-pipe passes from the inside to the outside of the car. It is used for ornament or "to make a finish" around the opening for the stove-pipe.

**Stove-plate.** Figs. 1500, etc. See *Bottom stove plate*.

**Stove-ring.** A *stove-pipe ring*, which see.

**"Straight-air"** (Westinghouse brake). A term now popu-

larly applied to the original form of the Westinghouse air-brake. It is used only in combination with the automatic air-brake and only for descending heavy gradients where it is necessary to re-charge the reservoirs, which is difficult with the automatic form. The *double-check valve*, which see, was used to enable either system to be used, but since the introduction of the *pressure-retaining valve*, fig. 317, which retains sufficient pressure to enable the train to be re-charged, the use of "straight-air" is passing away, since there is no longer danger of the train getting beyond control while re-charging the auxiliary reservoirs to make up for the loss of air in releasing the brakes.

**Straight closet-hopper.** Fig. 1093.

**Straight-tank (tank car).** One with the rings or plates of metal placed alternately inside and outside of each other, as in fig. 139, in distinction from *telescope tanks*, which see.

**Strainer (Westinghouse brake air-pump).** Figs. 294, etc. See *Air-strainer*.

**Straining-rod.** See *Brace straining-rod*.

**Strap.** A long narrow strip of leather, cloth or metal.

See <i>Axle safety-strap</i> .	<i>Door-strap</i> (street cars).
<i>Bell-cord strap</i> .	<i>Double pipe-strap</i> .
<i>Bell-strap</i> .	<i>Drawbar-strap</i> (English).
<i>Brake equalizer-strap</i> .	<i>Hand-strap</i> .
<i>Brake safety-strap</i> .	<i>Pipe-strap</i> .
<i>Dash-guard strap</i> .	<i>Roof-strap</i> .
<i>Diagonal roof-strap</i> .	<i>Safety-strap</i> .
<i>Signal-strap</i> (street cars).	

**Strap (for drop-door beam of coal cars).** 127, figs. 105-7.

A wrought-iron band attached to the top of the beam and extending downward on the outside of the car, to strengthen the connection between them, and protect the beam from wear.

**Strap-bolt, or lug-bolt.** Fig. 1869. A round bolt with a flat bar of iron welded to it, and usually with a hook on the end which serves the purpose of a head. The flat bar has holes in it, by which it is attached to a piece of timber or other object by one or more separate bolts or screws.

**Strap-brake (hoisting-gear).** 42, figs. 1821-4. A method of controlling the spools by an iron strap which is pressed down upon the spool by a treadle.

**Strap drawbar.** Figs. 450, etc. A *spring-pocket drawbar*, which see.

**Strap-hanger.** Figs. 734-7, etc. See *Bell-cord hanger*.

**Strap-hinge.** 1. Fig. 783. A door-hinge, the two parts of which are made longer than those of a butt-hinge, and of a triangular shape.

2. (Engli-h.) 71, figs. 116-119. In a freight car (*goods wagon*) a hinge in which the pin is welded to two flat bars at each end, and the main part of the hinge is turned while hot over the pin. The hinge has thus no loose part. The main part or strap is secured to the door, which it stiffens. The flat ends of the pin are bolted to the car. See *Hinge-plate*, 72, figs. 116-119. The main part of a strap hinge.

**Strap-sheave** (postal cars). Fig. 1078.

**Strap-washer, or washer plate.** 78, figs. 116-9. A wrought-iron strap which takes the heads of several bolts.

**Street car.** Figs. 1835-64. A light car, usually with four wheels, constructed for carrying passengers on street railways and generally drawn by horses; hence often called *horse-cars*. A common form of street car is the *two-horse-car* with two platforms, fig. 1837, but often much longer than shown. *Summer street cars* with the seats facing, fig. 1841, are very largely used, and are generally at least one section longer than the engraving. The *reversible seat* open street car is passing out of use. *One-horse street cars*, figs. 1836 and 1840, are largely used for subordinate lines and less frequently *reversible street cars*, fig. 1842. *Double-deck* or *top-seat* street cars are very rarely used in this country, although common in Europe.

The first street railway in the world was the New York & Harlem, incorporated in 1831. The first cars were run November, 1832, from Prince Street to Harlem Bridge, the cars being in the form of three stage bodies carried on a single set of wheels, with side doors only, but with a perch at each end for the driver. The next street railway completed was the Sixth Avenue of New York, in 1852. Immediate and rapid growth there and elsewhere followed, and by the year 1858 street cars were in use in all the large cities in the United States. A line in Paris was introduced in 1853, one in Cape Town, South Africa, in 1859, and one in Birkenhead, opposite Liverpool, in 1860.

**Street-car brake** (Tyler). Fig. 229. See *Tyler brake*.

Other styles are used, but the Tyler is most common.

**Street-car centre-lamp.** Figs. 833, 844, etc.

**Street-car pedestal-springs.** Figs. 2089-90.

**Street-car side-seats.** Fig. 1217.

**Street-car wheel.** Figs. 2137-40. A light cast-iron, *single-plate* or *open-plate* wheel.

**Strike-plate.** Figs. 1242, 1254, 1277, 1637, etc. The keeper for a *beveled* latch-bolt against which it strikes, so as to snap shut automatically. See *Keeper*, which is a general term including and often used as a substitute for strike-plate.

**Striker-arm.** Figs. 112-3, 1170-1, etc. A *seat-arm*, which see. The terms *striker-arm* and *seat-arm* are both used in the trade.

**Striker-plate.** See *Strike-plate*.

**String-board** (passenger-car steps). 7, fig. 686. A vertical board which supports the ends of the steps.

**Stringer.** (Carpentry.) "A horizontal timber connecting posts in a frame, as a tie-timber of a truss-bridge; a horizontal tie in a floor-framing."—*Knight*.

2. (Bridge construction.) The principal longitudinal timbers at the base of the roadway or track structure, analogous to the sills of cars. Hence, this name is often given to the sills of a car, as in figs. 1802, 1811, 1814.

3. (Pile-driver cars.) 6, figs. 1821-4. The *top-stringers*, which see.

**Stringer sway-brace** (pile-driver car). 4, figs. 1821-4. Cross-bracing for the top-stringers.

**Strip.**

See *Diagonal roof-strip*.

*Lining-strip.*

*Panel-strip.*

*Parting-strip.*

*Roof-strip.*

*Sash-parting strip.*

**Strut** (of a truss). 8, 9, figs. 2182-6. A member subjected to a strain of compression. A vertical strut is usually called a *post*.

**Stud.** 1. (Carpentry.) "A small piece of timber or joist inserted in the sills and beams between the posts to support the beams or other main timbers. The boards on the outside and the laths on the inside of a building are also nailed to the studs."—*Webster*. A vertical *seantling*, which see.

2. (Car construction.) 60, figs. 155-78; 16, fig. 1843. A short vertical wooden post between the window-posts



below the windows, extending from the side-sills to the window sills.

3. A standing bolt, pin, boss or protuberance designed to hold an attached object in place, especially one formed of a headless bolt permanently screwed into a tapped hole in a casting or forging so as to become a part thereof. See *Bracket-studs*, 6, figs. 366-7. *Brake-block suspending-stud*, 25, figs. 322-3. *Eccentric-lever stud*, 19, figs. 322-3. *Spring-stud*.

4. (For jointed side-pawl of Creamer brake, which see.) 13, fig. 263.

**Student lamp.** Figs. 851-4. A lamp having a form of argand burner, which see, connected by a *feed-tube K*, with a removable *reservoir* having a valve at the bottom to permit the slow escape of the oil. The reservoir is so placed that the level of the oil is very near to the flame. The whole lamp slides up and down upon a *standard* at discretion.

**Sub-door** (refrigerator cars). *S*, figs. 130-130½. A small door in a door, used when main doors open inward, and are thus liable to become blocked by freight shifting, to permit entrance for removal of obstruction. The sub-doors open outward.

**Suburban excursion-car.** Fig. 49½. A car with open sides and ends, which may be closed with curtains or blinds, for carrying passengers on suburban steam-roads in summer.

**Summer street-car.** Figs. 1839, 1841. See *Street car*.

**Summer street-car curtain.** Figs. 1839, 1841. A cloth usually made of heavy canvas, to inclose open cars and exclude rain or sunshine.

**Sun-burner** (mineral-oil lamp). Figs. 884-9. A lamp-burner, of which a great variety of forms differing in minor details exist, but which all agree in being provided with a chimney, wide and cylindrical at its base, and held in place by a thin circular metal plate, cut with indentations around its outer edge, so as to act as springs. See *Sun-hinge burner*.

**Sundries** (bolts, jacks, pulleys, turnbuckles, etc). Figs. 1865-87.

**Sun-hinge burner.** Figs. 885-7. A burner bearing an external resemblance to the *sun* burner and controlling the flame and air-supply in the same manner, but carrying the chimney like a *hinge* burner. A *no-chimney sun-hinge* burner, fig. 890, is also used.

**Sun lamp-chimney.** Fig. 930. See *Sun-burner* and *lamp-chimney*.

**Supply-pipe.** 1. ("American" horizontal-cylinder steam driver-brake.) 19, figs. 353-9. The steam supply-pipe to the brake-cylinder.

2. (Air-pump, Westinghouse brake.) 8, figs. 295-7, 294, etc. A pipe through which the air enters the air-pump. More commonly called *air-inlet*.

3. (Suspended heater.) *D*, figs. 1529-32. The inlet for cold air.

**Supply-valve** (of reducing-valve, West. train-signal apparatus, which see). 5, fig. 691.

**Support.** "That which upholds, sustains, or keeps from falling, as a prop, a pillar, a foundation of any kind."—*Webster*. See *Cylinder-lever support*. *Drummond support*. *Pipe support*.

**Susemihl & Miller grain-door.** Figs. 373-6. A grain-door which is moved in and out of place by swinging it upon a pivoted *guide-bar 2* working upon a *segment* or *quadrant 3*. The guide-bar is fixed at one end to the *guide-bar pivot* and attached at the other to the grain-door by the *guide-bar plate 5*. When out of use the door is supported upon the *grain-door rest 6* and when in use to close the door is kept in place by the *grain-door keeper 7*.

**Suspended heater.** Figs. 1529-32. A heater consisting of an exterior furnace carried, with coal supply, etc., under and outside of the body of the car, between the trucks, warming the car by currents of hot air or steam. Several different designs have at various times been tried. A modification of the *Baker heater*, which see, in this style has recently been made and is now known as the *Standard car-heater*. The draft of this latter is regulated by a valve connected with a diaphragm exposed to the pressure of the steam, which is carried at about 10 lbs. The radiating pipes are coated with wire coils to increase the radiating surface.

**Suspender-beam** (Miller platform). 29, fig. 638. A short transverse piece of timber framed into the drawbar timbers underneath the end-sill.

**Suspending-link.** 23, figs. 322-3. See *Brake-block suspending-link*. *Swing-hanger*.

**Suspending-plate.** 24, figs. 322-3. See *Brake-block suspending-plate*.

**Suspending-stud.** 25, figs. 322-3. See *Brake-block suspending-stud*.

**Sway-brace.** 4, figs. 1821-4. A term borrowed from the similar parts used in trusses to designate any form of diagonal bracing, but more especially timber planking spiked on the main timbers of a structure. See *Stringer sway-brace*.

**Sweeping-car, or sweeper.** Fig. 70. A car with rotary brooms for sweeping snow from a railroad track. The brooms are attached to a horizontal shaft which is connected by suitable gearing with the axles, and the brooms are thus made to revolve. Used only in cities.

**Swing-barrel truck.** Fig. 1904. A form of *freight truck*, which see, for rapidly loading barrels, having a bail to throw over the head of the barrel for holding it in place.

**Swing-beam.** See *Swing-bolster*. *Swing spring-plank*.

**Swing-bolster.** 30, figs. 1912-69. A truck-bolster (so called in distinction from a *rigid-bolster*) which bears on springs that are supported by a transverse timber called a *spring-plank*, which is suspended by *hangers* or *links*, so that it can swing laterally to the truck. As the springs rest on this plank and they support the bolster, the latter can swing with the spring-plank. The object of providing this swinging motion to the bolster is to prevent, as much as possible, lateral blows and shocks from being communicated to the car-body, and, *vice versa*, to prevent the momentum of the car-body from acting with its full force on the truck.

Nearly all passenger-car trucks are swing-bolster. In freight trucks practice is about evenly divided. At the Master Car-Builders' Convention, 1884, the vote in favor of adopting the swing-bolster in a standard truck was 32 to 30.

**Swing-bolster spring.** 40, figs. 1964-7. See *Lateral-motion spring*.

**Swing-hangers.** 46, figs. 1912-69. Bars or links attached at their upper ends to the transoms of a swing-motion truck, by which the spring-plank is suspended at their lower end so that it can swing laterally. Various forms are (1) solid bars with an eye at each end; (2) *swing link-hangers*, which see, figs. 2110-11, made like a long link of a chain; (3) those made with a fork or clevis at one end and a boss at the other; and (4), figs. 2112-13, those made with a very short link attached to

an eye-bolt passing through the transom. These latter are called *eye-bolt link-hangers*.

**Swing-hanger friction-block.** 50, figs. 1961-2. A casting, or bearing of considerable diameter, on which the upper end of a swing link-hanger rests. See also below.

**Swing-hanger friction-washer** (lower and upper, for swing link-hanger). 3 and 7, figs. 2110-11. A cast-iron chafing block serving no other purpose than to take the wear. It is only occasionally used. A *friction block* is almost synonymous, but is usually a larger casting.

**Swing-hanger pivot** (*lower* and *upper*) (passenger-car trucks). 47-8, figs. 1955-73; 2110-11. An iron bar by which a swing-hanger is suspended, or which supports a spring-plank. The lower swing-hanger pivot is more commonly called a *cross-bar* or *mandrel-pin*. The upper one is carried in a *swing-hanger pivot bearing* attached to the transom.

**Swing-hanger pivot bearing.** 49, figs. 1912-69. See above.

**Swing-hanger shaft.** A *swing-hanger pivot* or *cross-bar*, which see.

**Swinging-platform** (pile-driver car). Figs. 1821-4. A platform carrying the entire pile-driving gear in such manner that it can be swung about at right angles to the car so as to project for a considerable distance on either side. It swings upon a *centre-plate* and its movements are controlled by the *swinging-gear*, which see. A *cabin* is almost always built upon it and the floor is constructed with sills and end-sills corresponding to those usually used in a car-floor. Removable *wings*, 20, are sometimes provided to support the swinging-platform when swung out in this manner. See *Pile-driver car*.

**Swinging-platform centre-plate** (pile-driver car). 46, fig. 1822. See above.

**Swinging-platform end-sill** (pile-driver car). 18, figs. 1821-4. See above.

**Swinging-platform sill** (pile-driver car). 18', figs. 1821-4. See above.

**Swinging-sash.** A window or blind sash which is hung and swings on hinges. See *Door-case sash* (street cars). Otherwise rarely used.

**Swing-joint** (Cobb's pivoted seat-arm, which see). 3, fig. 1171. More properly *seat back pivot*. A pivot joint in the middle of the seat-back to which the *seat-arm* is



attached. An ordinary seat-arm is rigidly attached to the seat-back at right angles thereto.

**Swing-links, etc.** Figs. 2107-2113. See *Swing-hanger*.

**Swing link-hanger.** 46, fig. 1962; 1, figs. 2110-11. A swing-hanger, which see, made in the form of an open link.

**Swing-motion.** A term applied to an arrangement of hangers and other supports for the springs and truck-bolster which enables a car-body to swing laterally on the truck. See *Swing-bolster*. *Swing-hanger*.

**Swing-motion gear.** See above.

**Swing-motion spring.** 1. A *bolster-spring*, which see.

2. A *lateral-motion spring*. 40, figs. 1964-7.

**Swing-motion truck.** Figs. 1912-20, etc. A truck with a bolster and spring-plank suspended on swing-hangers so that they can swing laterally to the truck-frame. Also called *swing-bolster truck* in distinction from a *rigid-bolster truck*.

**Swing spring-plank.** 43, figs. 1912-69. A transverse timber underneath the *bolster* of a four-wheeled truck, or the *spring-beam* of a six-wheeled truck, on which the bolster-springs rest. A *swing spring-plank* differs from an ordinary spring-plank in being supported by hangers or links. See *Spring-plank*.

**Switching.** The act of moving cars from one track to another by means of switches, as in making up or separating trains, and placing the cars on the tracks and in the places where they are needed. Also occasionally called *drilling*, or *regulating*, and in England *slanting* or *marshaling*.

**Switching-eye.** Fig. 657. More commonly, *push-block*, which see. A cast-iron socket usually attached to the lower corner-plate of a freight-car, to which a push-bar can be attached, to move the car by an engine on an adjoining track. A *pull-iron*, 58, figs. 132-8, is sometimes called a switching-eye.

**Swivel.** 1. (Of a chain.) A twisting link, consisting of a headed pin, entering into an eye or ring in an adjacent link, as in the turnbuckle, fig. 1881. The object is to avoid kinking. Hence the term is applied to many forms of equivalent devices, consisting essentially of a ring surrounding a headed bolt in such manner as to permit rotation.

2. (For end ventilator opener.) Fig. 1605. See above.

3. (Janney-Miller coupler.) 61, figs. 554, 603-55.

One of the parts connecting the *platform-lever* to the *Millerhook*. It enters on to the *swivel-hook* 62.

**Swivel-hook** (Janney-Miller coupler). See above.

**Swivel turnbuckle.** Fig. 1881. One of the commonest forms of turnbuckle, which see. See also *swivel*.

## T

**T, or Tee** (pipe fittings, which see). Figs. 1338, 1343, etc.

A T-shaped cast-iron tube for uniting one pipe at right angles to two others in the same line. The pipes are screwed into the arms of the T. A *reducing-tee*, which see, has the arms of different diameters.

**Taber burner.** A burner similar to the *dual*, figs. 873-4, except that it has two wicks in one tube instead of a separate tube for each wick.

**Table** (parlor and sleeping car-). 40, fig. 679. A removable board attached to the side of the car by inserting a *table-hook* fixed to the table into a *table-hook plate* fixed to the side of the car. The inner end of the table is supported by a table-leg, which is sometimes vertical and sometimes *slanting*, which see. The tables of *dining-cars*, which see, are permanently fastened to the floor and sides of the car. A *drop-table*, fig. 193, is used in the kitchens of dining-cars.

**Table furnishings.** Figs. 1533-1552.

**Table-holder.** Fig. 1543. A special form of *table-hook*. See *Table*.

**Table-hook.** 19, fig. 678; figs. 1539, 1543. See *Table*.

**Table-hook plate.** Figs. 1538-44; 20, fig. 678. See *Table*.

**Table-leg hook.** 40, fig. 695. A metal hook which is attached to a *slanting table-leg*. It engages in a *plate* attached to the side of the car. See *Slanting table-leg*.

**Table-leg-hook plate.** 41, figs. 694-5. See *Slanting table-leg*.

**Tag** (seal-lock). M, fig. 1011; 1, fig. 1109, etc. A loose label used chiefly in connection with seals. They are now often made of metal.

**Tag-holder** (seal-lock). L, fig. 1011.

**Tag-holder clasp** (seal-lock). K, fig. 1011.

**Tail-lamp, or tail light.** 141, figs. 102-3; figs. 907-73.

A signal-lamp attached to the rear end of a train. They are always carried on the platform, usually in pairs, and very commonly also at the side of the car so as to be

visible from the engine. They are often of two or more colors.

2. (English.) A colored signal lamp carried at the rear end of the last vehicle of a train. See also *Side lamp*.

**Tail-pin** (of Janney coupler). 18, figs. 542-554, 555-601. A short wrought-iron pin securing the *draft-bolt* to the *coupler*.

**Tangye hydraulic jack**. Fig. 1887. One of the more elaborate and complete forms of hydraulic jacks, which see. The internal construction of all hydraulic jacks bears a general resemblance to that shown, but is ordinarily less elaborate.

**Tank**. 1. (Passenger cars.) 1, fig. 1570. A *water tank* for the wash-room.

2. (Pintsch gas-lighting apparatus.) H, fig. 812. More properly *recipient*, which see.

3 (Tank car.) 106, figs. 139-42. A boiler-iron receptacle for oil, sometimes made of uniform diameter or *straight*, but generally made *telescopic* by slipping each successive ring inside the other, so as to bevel the tank towards the middle, to afford better drainage. It is held in place by *tank-bands*, fastened to *tank band hooks* on the top of the car to prevent the tank from turning. A *tank-dome* is added at the top and *tank-heads* are used to close the ends. A *tank-nozzle* is used for emptying the oil, closed by a *tank-nozzle cap*, which latter is fastened to the nozzle by a *tank-nozzle cap chain*. The oil is drawn off through the *tank-valve*, which see.

4. (Westinghouse brake.) 1, figs. 295-7. The *main reservoir*.

5. (Winslow heater.) Figs. 1534-6. See *Safety-tank*. See also *Safety water-base* (Bissell heater).

**Tank-band**. 107, figs. 139-42. See *Tank*.

**Tank-band hook**. See *Tank*.

**Tank car**. Figs. 22, 139-42. A car provided with a large *tank*, which see, for carrying oil. They were formerly in very extended use, but have been partially supplanted by the introduction of pipe-lines, of which some thousands of miles are now in use.

**Tank-dome**. 108, fig. 139-42. See *Tank*.

**Tank-head**. 106', figs. 139-42. See *Tank*.

**Tank-nozzle**. 115, figs. 139-42. A short pipe used to empty the *tank*, which see. It is usually cast in one piece with the *tank-valve seat*, which see.

**Tank-nozzle cap**. 118, figs. 139, 142. See *Tank*.

**Tank-nozzle-cap chain**. See *Tank*.

**Tank-step** (tank car). A metal shelf or bracket fastened to the tank to facilitate access to the top of the dome.

**Tank-valve**. 1. (Tank-car). 114, figs. 139, 142. A valve attached to the bottom of the tank to draw off the contents.

2. (Water-cooler). Figs. 1597-9. A valve used with water tanks which extend to the roof, and sometimes with other smaller fixed tanks, for enabling them to be completely drained when desired. Also called *water-cooler valve*.

**Tank-valve cage**. 116, figs. 139, 142. A metal inclosure, over the top of a tank-valve, as a guide for it.

**Tank-valve rod**. 117, figs. 139, 142. A rod for opening and closing a tank-valve extending from the valve to the top of the dome.

**Tank-valve seat**. 115, figs. 139, 142. A metal plate, with one opening in it, closed by the valve. It is riveted to the underside of the tank and has a *nozzle* attached to it to which pipes are connected for conducting the oil.

**Tanner brake**. Fig. 233. A device for operating brakes on two trucks at once, which is said to be the invention of Mr. Henry Tanner, and was patented by him in 1852. It consists of a lever 9, having a fixed fulcrum in its centre attached to the body of the car. The ends of this lever are connected by rods and chains 4, 4, with the brake-shafts at the two ends of the car; and at points intermediate between the ends and the fulcrum, the lever is connected by rods 6, 6, with the brake levers 2, 2. The centre-lever 9 can thus be operated and the brakes be applied to both trucks by the brake-shaft and wheel at either end of the car. A difficulty with this form of brake is, that unless the adjustment of the connecting-rods and brake-shoes is perfect, the pressure of the brakes will not be alike on the two trucks.

**Target-lamp** (operator's). Fig. 971. A *signal-lamp*, which see, used for attaching to fixed targets or semaphore signals. No special form of signal-lamp is required or used for this purpose except that they are powerful and well-constructed lamps.

**Tarpaulin**, or wagon-sheet (English). A piece of stout, flexible waterproof painted canvas, measuring about 20 × 12 ft., used to protect the contents of open freight cars (wagons) from the weather. Cords fastened to its edges are tied to *sheet-rings* (which see), by which it is



firmly secured to the vehicle. It is largely used, as it saves much of the dead weight of a covered car, and gives an equally good protection, except from theft.

**Tassel.** See *Window-curtain tassel*. 33, fig. 695.

**Tassel-hook.** See *Window-curtain holder*. 29, figs. 693-5. Both tassels and tassel-hooks are now rarely used.

**T-bolt (English).** See *Spring-link adjusting-screw*.

**T-bolt (long) (Janney coupler).** 13, figs. 542-554, 555-601. The bolt passing through the *centre buffer-spring*, and securing it to the yoke and equalizer.

**T-bolt (short) (Janney coupler).** 14, figs. 542-554, 555-601. The bolt uniting the *combination-yoke* to the *horn*.

**T door-knob** (for narrow-stile doors). Fig. 750.

**Teak.** An oily, hard and most durable wood, raised in India. Largely used for ship-building or other purposes requiring strength and exceptional durability. It has an oily, odorous sap, shrinks little, and does not corrode iron. Generally used for passenger car bodies in England.

**Teak-wood-centre wheel.** Figs. 2151-8. A form of steel-tired wheel, in which triangular blocks of teak-wood are used to connect the hub to the tire, which latter is attached to the wood by *Mansell retaining-rings*. This wheel is the almost universal standard for English passenger service, but it has been considered that it would not stand the dry American climate. See *Wheel. Car-wheel. Mansell wheel*.

**Tee.** See T.

**Telegraph-cock, or faucet.** Figs. 1592-5. A self-closing cock, the lever of which resembles the key of a telegraph instrument. See *Lever-faucet*. When the water enters the cock horizontally they are called *horizontal telegraph-cocks*, as fig. 1592. When it enters vertically they are called *vertical telegraph cocks*. See *Faucet*.

**Telegraph hand-car.** Figs. 1712-14 (3-wheeled) and fig. 1716, with table of dimensions and weight. A light hand-car for the use of telegraph linemen.

**Telescope-drop (centre-lamps).** Fig. 839. A series of tubes telescoped one within the other in such manner as to enable the lamp to be readily lowered for lighting or filling. They are not in general use.

**Telescope-truck.** Fig. 1905. One of the many special forms of *freight-trucks*, which see, so constructed as to grasp a light packing-box or other load by hooks of

readily adjustable distance apart. They are caused to engage by simply pressing on the handles.

**Telescopic tank** (tank cars). See *Tank*.

**Tender-brake.** 1. (American Brake Co.) Fig. 366-7. See *steam tender-brake*.

2. (Westinghouse brake). Figs. 295-7. See *Westinghouse brake*. The Westinghouse tender brake-gear does not differ essentially from that used under cars, except that the brake-cylinder has a *piston-sleeve*, which see, which has now been dispensed with in the car-gear.

**Tender-buffer** (Janney coupler). 75 and 76, fig. 602-35. The buffer used on locomotive tenders so as to meet the buffers on passenger cars equipped with the Janney coupler. They are made both *flat-face* and *round-face*. Similar attachments for the Miller coupler have recently been introduced, but a mere loose link is much used.

**Tender coupler** (Janney coupler). 74, figs. 602-35. The appliance for coupling locomotive tenders to cars equipped with Janney couplers. See above.

**Tender-coupler catch-spring** (Janney coupler). 72, figs. 602-35. See *Catch-spring*.

**Tender-cylinder** (Westinghouse brake). Figs. 307, 330. See *Brake-cylinder*.

**Tender drain-cup** (Westinghouse brake). 26, fig. 311. A larger cup than that used under cars.

**Tender-hose** (Westinghouse brake). 11, fig. 297; 54, fig. 311. A hose which connects the brake-pipe on the tender with the engine. It has no coupling, and is usually attached to the engine pipe by a union-joint.

**Ten-group bolster-spring.** Fig. 2085. See *Spiral-spring*.

**Tenon.** 1. The projecting end of a piece of timber fitted for insertion into a *mortise* by cutting away a portion on one or more sides. Sometimes the tenon is made cylindrical. Tenons are secured in their mortises by pins or by giving them a *dove-tail*, which see.

2. (Of lamp-platform, which see.) A, fig. 1190.

3. (Standard brake-shoe.) Fig. 1977. The part so called is not strictly a tenon.

**Tension-bar.** Any bar subjected to a tensile strain. The upper member of an iron body-bolster, 2, fig. 217-19, is called the *tension-bar*.

**Tension-member** (of a frame, truss, beam or girder). *Truss-rods, brake-rods*, etc., are tension members in distinction from *compression-members*, which see.

**Tension-rod** (of a derrick or crane). 7, figs. 77-78; J, fig.

145; **D**<sub>3</sub>, figs. 151-3. A horizontal stay connecting the top of the *mast* and *boom*. It is of fixed length in a crane and of adjustable length in a derrick. See *Derrick*.

**Tension-rod clevis** (of a derrick or crane). **L**<sub>2</sub>, figs. 151-3. A clevis, which see, sometimes carried at the upper end of the *boom* to which the *tension-rod* connecting the boom and mast is attached.

**Test bar** (for limit gauges). Fig. 1825. A bar for testing the correctness of *limit-gauges*, which see.

**T-hanger**. See *Spring-hanger*.

**Thatcher corrugated wheel**. Figs. 2144-45. A *single-plate* wheel in which the use of *brackets* to stiffen the plate is dispensed with, by making the entire plate of a corrugated form.

**Theatre-seats** (dining cars). Figs. 193, 214. An ordinary double car-seat having two separate seat-bottoms which can be raised up into a vertical position in the manner usual in theatres, in order to make the inner seats more easy of access. All modern dining cars have these seats.

**Thermometer** (passenger cars). Fig. 1047. A somewhat elaborate form of the familiar instrument for measuring temperature. It is usually conspicuous by its absence.

**Thielsen truck**. Figs. 1937-40, 1821-4, etc. An all iron freight-car truck invented by Mr. H. Thielsen, now of Portland, Oregon, having rolled iron *channel-bar* transoms riveted to a *transom-casting* at each end. It is in wide and general use and several modified types exist, as figs. 1915-20, and a number of others not shown by drawings. The essential feature upon which the patent is claimed is in the riveting of the arch-bars and channel-bar transoms to the transom casting.

**Thimble**. 1. A bushing.

2. A sleeve or tube through which a bolt passes, and which may act as a distance-piece. A thimble is usually round, but sometimes square, as *smoke-pipe thimble*, fig. 1426.

See *Axle-safety bearing thimble*. *Body bolster thimble*. *Brake-shaft thimble*. *Buffer-thimble*.

3. (Janney coupler.) **37**, figs. 555-601. A small casting in which the point of the catch-lever rests.

4. (Wilson's flexible car-window blind.) **D**, fig. 1646. A closely-wound bit of spiral wire, serving as a distance-piece for the slats.

**T-hinge**. Fig. 784. A door-hinge, one part of which is

made like a *strap-hinge*, and the other like a *butt-hinge*, so that the shape of the whole resembles a letter T.

**Third-class carriagé** (English). A car which performs much the same functions as an American so-called "first-class" passenger car, since it carries 83 per cent. of the passengers, but very dissimilar in arrangement, weight and size. It generally weighs about 20,000 lbs. and is carried on four or six wheels, divided into five compartments, and seats fifty passengers. The seats and backs are comfortably shaped and upholstered in rep, stuffed with horsehair. Sofa springs and carpets are generally omitted, but parcel-nets and blinds are generally provided. The comfort of this class of carriage has been very much improved of late years, and in respect to the seats is perhaps superior to that of ordinary American cars. The interior finish is considerably inferior, the interior being generally painted and grained.

**Thomas' steel-tired wheel**. Figs. 2174-76. A wheel invented by Theodore Thomas, President of the Jersey City Wheel Foundry & Machine Works, the essential feature of which is the use of wooden *cushioning-blocks* inserted in *cushioning-pockets* in the *wheel-centre* so that the *tire* bears entirely upon these compressed blocks. The tire has an *internal-flange* by which it is bolted to the wheel-centre through the *radial-arms*. The wooden cushioning blocks are forced into the cushioning pockets under pressure.

**Thread**. See *Screw-thread*.

**Three-group graduated bolster-spring**. Fig. 2105. See *Graduated Spring*. *Spiral spring*.

**Three-group spiral spring**. Figs. 2073-5. See *Spiral spring*.

**Three-link drawbar**. Figs. 383-6, 451, 467. A *Potter* drawbar, which see.

**Three-way cock** (Westinghouse brake). Figs. 318-9. A cock formerly carried on the locomotive for applying and releasing the brakes. It has been supplanted by the *engineer's brake-valve*, figs. 334, etc., which see.

**Three-way joint** (Coolhaugh's lamp-holder). Figs. 967-968. A kind of knuckle-joint admitting of motion in any one of three directions.

**Three-wheeled hand-car**. Figs. 1712, 1714. A light hand-car with two wheels on one rail, somewhat like a velocipede, and a third wheel on the opposite rail merely to steady the vehicle. They are worked either with



levers operated by the hands, or by treadles with the feet, or both. See *Hand-car*.

**Threshold**, or **threshold-plate** (passenger cars). A *Door-sill*, which see.

**Throat** (of a car-wheel). The interior angle of a flange where it joins on to the tread of the wheel. See *Flange*.

**Throttle-valve** (*Westinghouse brake*). 13, figs. 295-7. An angle globe-valve (*i. e.*, one having the entrance and exit pipes at right angles to each other) attached to the locomotive for admitting steam to and shutting it off from the air-pump.

**Through body-bolt** (English). 75, figs. 116-118. Nearest American equivalent, *sill-and-plate rod*. A bolt passing vertically through the body and securing the various parts of the sides or ends together.

**Thumb-lever** (Hartley chair). 10, figs. 1154-8. The catch or lever by which the position of the head-rest is controlled.

**Thumb-piece**. F, fig. 1623. A general term applied to many forms of lugs or projections for moving springs, catches, or other movable mechanical parts.

**Thumb-screw**. A screw with two projecting flat-sided flanges adapted to be turned with the finger and thumb.

**Ticket-holder**. Fig. 1258; 25, fig. 678. A metal clip or spring attached to the side of a sleeping-car berth for holding the tickets of the occupant of the berth. They are now rarely if ever used, on account of the danger of theft, tickets being collected by the sleeping-car porter for the night.

**Tie**. "A beam or rod which secures parts together and is subjected to a tensile strain. It is the opposite of a strut or straining-piece, which acts to keep objects apart, and is subject to a compressing force."—*Knight*.

**Tie-bar**. A bar which acts as a tie. See *Draw-timber tie-bar*. *Pedestal tie-bar*. *Pedestal-brace tie-bar*. *Transom tie-bar*.

**Tie-bolt** (Janney coupler). 110, fig. 553. A long bolt passing through the end-sill and holding on the *buffer-beam* outside of the *platform end timber*.

**Tie-plate**. 1. A *main carline*, which see.

2. (Iron-frame car.) C, fig. 147. Flat plates riveted to the top flange of the iron sills, usually over the bolsters and sometimes between them, to connect the sills together and serve the same purpose as the *floor-*

*timber distance-blocks* and *sill tie-rod*, with wooden sills.

**Tie-rod**. A rod which acts as a tie.

See *Body-counterbrace tie-rod*. *Girth tie-rod*.  
*Brake-block tie-rod*. *Lever-frame tie-rod*.  
*Cylinder-lever tie-rod*. *Platform tie-rod*.  
*End-brace tie-rod*. *Safety-beam tie-rod*.  
*End-girth tie-rod*. *Sill tie-rod*.  
*Wheel-piece tie-rod*.

**Tie-timber**. See *Cross-frame tie-timber*.

**Tiffany refrigerator car**. Figs. 11-12, 130a. An ice and salt car belonging to the class of cars having the ice-supply on the roof. The *ice-pan* is V-shaped, and the *ice-pan gutter* carries off the drainage-water through a *conductor-tube* of 2½-in. galvanized-iron pipe leading to a *drip-pan* under the car. Insulation is effected by dividing the sides by two intermediate partitions of half-inch boards into three spaces, of which two are air-tight, and one, the outer, ventilated. Four thicknesses of felt, lapped at the joints and fastened by tin tacks, are also used. The cars were formerly built 28 ft. in length (inside measurement). The more recent cars are built 30 ft. long, inside. Their weight is about 25,000 lbs.; ice capacity, 4,000 lbs. See *Refrigerator-car*.

**Timber**. A stick of wood of considerable size.

See *Brake-hanger timber*. *Platform-timber*.  
*Cross-frame tie-timber*. *Rock-er-bearing timber*.  
*Diagonal floor-timber*. *Rocker-timber*.  
*Drawbar cross-timber*. *Spring-plank timber*.  
*Draw-timber*. *Transverse floor-timber*.  
*Pedestal-timber*. *Wheel-timber, etc.*  
 See also *Block, post, sill, etc.*

**Timber-wagon** (English). A short four-wheeled flat car with a swiveling bolster, chains, posts, etc., adapted to carry timber in the log, which rests on two or three *timber-wagons* coupled together.

**Tim's journal-box**. Figs. 2011-12. A little used style of journal-box having an *oil-cellar* under the usual receptacle for packing.

**Tin car-roof**. A roof consisting of a layer of boards resting on the rafters and running lengthwise to the car, covered with tin plates, the edges of which are soldered together. Now rarely, if ever, used except for passenger cars.

**Tip**. Figs. 1267-73. An ornamental knob on the end of

- a rod. More commonly called *acorn*. See *Basket-rack tip*. *Berth curtain-rod tip*.
- Tip car.** Figs. 24-5, 39-40, 143. A car so constructed that its body can be tipped so as to allow its contents to slide out. Often also called *dump-car*. They are sometimes *eight-wheeled* but usually *four-wheeled*. A style of eight-wheeled tip car has been introduced to some extent, which is slowly tipped by gearing, known as the *Van Wormer car*.
- Tip-car door.** 154, fig. 143.
- Tire.** 5, figs. 2148-9, 2177-80, etc. A heavy hoop or band of iron or (usually) steel forming the ring or periphery of a wheel to impart strength to it and to resist wear. In this country car-wheels are generally *cast*, but within a few years steel-tired wheels have come into general use for passenger service. They have been practically universal in European practice, and multitudes of devices for fastening them securely to the wheel have been devised. See *Tire-fastening*. The usual dimensions for tires are  $5\frac{1}{4}$  to  $5\frac{1}{2}$  ins. extreme width by  $2\frac{1}{2}$  to 3 in. thick.
- In England the word is usually spelt *tyre*. The name is supposed to come from the fact that iron bands were first used on wheels in the city of Tyre, Syria.
- Tire-bolt.** 2, figs. 2148-9, 2177-80, etc. A screw-bolt for holding a tire on a wheel-centre. When *retaining-rings* are used the bolts pass through the rings and hold them and the centre and tire together.
- Tire-fastening.** 30, fig. 116 and figs. 2151 to fig. 2158 show the principal English methods. Other modes are shown on figs. 2160, 2163-64, 2166-68, 2169-71, and 2175. The *Mansell* fastening, less clearly shown in figs. 2162-65 and 2177-78, is the mode of securing the tire to the wheel which becomes operative when the shrinkage of the tire alone is insufficient to prevent the latter leaving the wheel. In England the methods shown in figs. 2156, 2157 and 2158, are the most approved. No tire fastened by either of these methods has ever left the wheel, even when the tire has broken.
- Toe (of a car-wheel flange).** The extreme outer point where the wheel has the largest diameter.
- Toe-nail.** A nail driven in obliquely to fasten the end of a board or other piece of timber to the surface of another. The stick so fastened is said to be *toed*.
- Toilet.** Figs. 213, etc. Another name for a *saloon*.

- Tongs, or crabs (pile-driver and wrecking cars).** 22, figs. 1821-4, fig. 144. A device for anchoring the body of the car to the track when in use. A *jack-screw* is used in connection with the tongs to raise the body of the car, so as to bring a strain upon the tongs. See *Bolster jack-screw*, which is a different device for the same purpose.
- Tool-box.** 24, figs. 77-8. A box very frequently placed under the body of the car, especially in derrick or wrecking cars, for carrying tools and supplies.
- Tool car.** A box car arranged for carrying all kinds of tools, ropes, etc., which are used, in case of accident to trains on the road, in replacing or removing the cars or engines on or from the track. Such cars are often used when any heavy objects are to be moved, as is necessary in erecting bridges, etc.
- Tool cars are also known as *block cars* and are often fitted up with sleeping berths for workmen. A tool car usually serves as a tender for every wrecking car.
- Top.** See *Base-top*, *cast-iron top*, *main-top*, *smoke-top*, etc., of Baker, Bissell, and other heaters, figs. 1300-1537.
- Top arch-bar.** Fig. 1785. More properly, simply *arch-bar*, which see.
- Top-arm (Creamer brake, which see).** 4, figs. 263-4.
- Top-chord (of a truss).** 13, figs. 2181-7. The upper outside member of a truss, especially one divided up into panels. The members of mere *trussed beams*, like figs. 2181-2, are not commonly designated as chords.
- Top (or upper) cylinder-head (Westinghouse driving-wheel brake-cylinder).** 5, figs. 314-5. See *Cylinder-head*.
- Top door-rail.** 149, figs. 158-85; 4, fig. 370. The uppermost horizontal bar or piece of a door-frame.
- Top door-track.** 65, figs. 87-96, 132-8. See *Door-track*.
- Top end-rail (coal car).** 137, figs. 105-7. A horizontal stick of timber which forms the top of the end frame.
- Top light-rail (English).** 103, figs. 204, 205. A part of the body-framing of a carriage forming the top of the window opening.
- Top of case (Gouge heater).** 79, fig. 1409. See *Case*.
- Top of mouth-piece (Gouge heater).** 4, fig. 1407. See *Mouth-piece*.
- Top panel-batten (English).** 107, fig. 205. American equivalent, *furring*. A part of the body-framing to stiffen the top-panel, which is pinned to it.



**Top-plate** (Spear heater). Figs. 1493-1518. Similar parts are used in nearly all stoves. See *Top*. *Outside top-plate*. *Inside top-plate*.

**Top-rail** (of door). 4, fig. 370, etc. See *Top door-rail*.

**Top-reservoir journal-box**. Fig. 2010. A journal-box having a reservoir for oil or grease above the journal, from which the oil flows to the journal. Rarely used in this country, but common in Europe, with either oil or some form of grease as a lubricant.

**Top-ring**. 1. (Base-plate of Spear heater). 22, figs. 1486-90; figs. 1510-13. A cast-iron ring which rests on top of the *base-plate*, to which the *casing* is attached.

2. (Johnson heater). 25, fig. 1472.

**Top-seat street-car**. Fig. 1838. See *Street car*.

**Top side-bearing**. A *body side-bearing*. See *Side-bearing*.

**Top side-rail** (coal car). 136, figs. 105-7. The horizontal piece of timber which forms the top of the side. A similar part in roofed cars is called the *plate*.

**Top-stringers** (of pile-driver car). 6, figs. 1821-4. See *Leader*.

**Top-valve** (Westinghouse engineer's brake-valve, which see). 3, fig. 334. The valve by which compressed air is permitted to escape to apply the brakes.

**Tornado-lamp**. A general term applied to lamps which receive their supply of air through a long tube, usually connected with the supports or arms of the lamp, so as to check the effect of sudden gusts of wind. Figs. 835, 838, 845, 860, 867 are on this principle. *Hurricane-lamp* is another name for the same thing.

**Torpedo**. Fig. 1886. A cylindrical detonating cap provided with clips for folding under the head of the rail for the purpose of making a loud alarm as a signal on the passage of engines over them. The basis of the detonating compound is fulminate of mercury. The interior pieces of iron, to insure the explosion of the fulminate, are termed *anvils*. The best torpedoes have three anvils. A torpedo with spring clips has recently been introduced for attaching to the track from the rear end of a train in motion by means of a patented *carrier* to be held in the hands of the trainman, which insures that the torpedo will not escape except to clasp the head of the rail. The same device is also used to attach blue-lights to the track, burning for a fixed length of time.

**Torrey door-spring**. Fig. 755. See *Door-spring*.

**Towel-rack**. Fig. 1583. A tray for holding clean towels.

**Towel-rod**. Figs. 1587-90.

**Towel-roller bracket**. 2, figs. 1585-6, 1589. A bracket for supporting a *towel-roller*. There are two, the *fixed-end* and *loose-end* bracket. The principal supply of towels, however, is usually carried in a towel-rack or hung on towel-rods.

**Track**. A rail or bar which forms a path on which anything, as a door, runs. Sliding doors have usually two door-tracks, *bottom* and *top door-track*, as 65, 66, fig. 82, etc.

2. (Pile-driver car.) 47, figs. 1821-4. A circular track upon which the rollers of the swinging-platform travel. A *rack* is connected with it, as a part of the *swinging-gear*.

**Track-sweeper**. Fig. 70. A *sweeping car*, which see. For city use only.

**Train-car**. Figs. 44-7, etc. A *caboose car*, which see.

**Train signal-lamp**. 141, figs. 102-3. A lamp attached to a car as a signal, usually to the last car on a train, and commonly called a *tail-light*. See *Signal-lamp*. They are usually some form of lantern, like figs. 956-73. Lanterns of ordinary form, but usually with red globes, are also used.

**Train-signaling apparatus** (Westinghouse). Figs. 687-91, 325. A substitute for the bell-cord arranged to give train signals by compressed air. A separate line of *signal-pipe* similar to the brake-pipe extends throughout the train, connected between the cars by hose and couplings. A *car signal-valve*, connected to this signal-pipe, is located in each car and attached to the bell-cord, in such manner that pulling on the cord releases air from the signal-pipe. On the engine is a small *signal-reservoir*, to one end of which is fastened the *signal-valve*, which is also connected with the main signal-pipe and a small *signal-whistle*. The supply of air is received from the main reservoir through a *reducing-valve*, which maintains a constant and low pressure of about 15 lbs. per square inch in the signal apparatus.

When the car valve is opened by pulling on the cord the pressure in the reservoir moves the *diaphragm* in the signal-valve so as to carry the valve 5 away from its seat, permitting a portion of the air in the reservoir to escape and blow the whistle. Signals can be given in this way at the rate of four or five per second with great cer-

tainty. If the train breaks in two the whistle is blown loudly for a considerable time.

**Transom.** 1. Primarily a cross-piece.

2. (Carpentry.) A horizontal piece framed across a door or double-light window. The term is also applied in the general sense of a cross-piece in other ways.

3. (Car-building, swing-bolster trucks.) 20, figs. 1912-67. One of two horizontal cross-beams attached to the side-frames, between which the swing-bolster is placed. They are usually made of wood, but recently they have been made of iron. See also *Middle-transom*. *Outside-transom* (six-wheel trucks, figs. 1969-73).

4. 22, figs. 82-92; 26, figs. 155-185. The *body-bolster* is also sometimes called a *transom* or *body-transom*, but incorrectly. The term *body-transom* is more properly limited, when used at all, to the *needle-beam* or *cross-frame tie timber*, which see.

5. (English.) Commonly spelled *transome*, which see. **Transom bearing-block.** A piece of wood or iron placed on top of a transom, under the attachment or bearing of a swing-hanger, to raise it up higher.

**Transom-casting.** 28, figs. 1912-40. A casting attached to a truck-frame and to which the end of one or both of the transoms are fastened.

**Transom chafing-plate.** 27, figs. 1955-69. A plate attached to the side of a transom to prevent it from abrasion.

**Transome** (English). 3, figs. 116-7, 204-6. A *needle-beam* or *cross-frame tie-timber*, which see. More commonly called *cross-bearer*, which latter term is also in use in this country.

**Transom-pillar** (diamond trucks). 29, figs. 1937-9. A small casting acting as a distance-piece between the transom and inverted arch-bar.

**Transom tie-bar.** 23, figs. 1955-67. A wrought-iron bar bolted to a pair of transoms, sometimes above and sometimes below, to hold them together.

**Transom truss-block.** 25, figs. 1945-6, 1955-69. See *Transom truss-rod*.

**Transom truss-rod.** 24, figs. 1945-6, 1955-69. Transverse rods attached at their ends to the wheel-pieces, which extend alongside the transoms and are inclined downward under a central *transom truss-block* so as to strengthen the transoms. Generally, two such rods are used with each truck.

**Transom truss-rod washer.** 26, figs. 1945-6, 1955-69. See *Washer*.

**Transverse floor-timbers** (tank and street cars). 11, figs. 139-42; 10, fig. 1843. Timbers which extend across the car underneath the floor and on which the latter rests. They are used only when there are only two sills. Not to be confused with *needle-beams*, which are under the sills.

**Transverse tie-rod** (English). 10, figs. 205, 206. American equivalent, *sill tie-rod*. A long rod which serves to bind together the *underframe* transversely.

**Trap** (for refrigerator car). E, fig. 131. An S-shaped pipe largely used in all forms of plumbing work for permitting the exit of water while preventing the entrance of air.

2. (Gouge heater.) 6, figs. 1405-7. See *Cinder-trap*.

**Trap-door.** A door in a floor or roof, closing flush therewith when shut.

By resolution of the Master Car-Builders' Association, 1884, it was recommended that a trap-door be added in the roof of passenger cars as a safeguard in case of accident. See also *Platform trap-door*.

2. (Janney-Miller coupler.) 68, figs. 602-35. A small iron door in the platform giving access to the centre buffer-yoke.

3. (Lorenz refrigerator car.) N, figs. 130-130½. A door in the floor, giving access to the drip-pan, etc.

**Trap-door spring** (Janney-Miller coupler). 65, figs. 602-35. The spring used to keep the trap-door securely closed.

**Tread.** 1. (Of a step.) The part on which the foot is placed. See *Tread-board*. *Rubber-tread*.

2. (Of a car-wheel.) 25, fig. 2002. The exterior cylindrical surface of a car-wheel inside of the flange which comes in contact with the rail. The usual width is about 4 in., measured from the throat or inside of the flange, and about 5½ in. out to out measurement, from outside of flange to outside of wheel. Variations of a fraction of an inch either way are as yet frequent, no standard section having yet been adopted.

**Tread-board** (of a step). 46, figs. 155-85. The horizontal part on which the foot is placed.

**Treadle** (for hand-car brake). 4, figs. 1724-6. (For pile-driver car winding-gear.) 42, figs. 1821-4. A foot lever connected to any form of machinery or to a brake, for actuating or controlling the same.



**Triangular washer.** Fig. 1877. An iron plate or block, the cross-section of which is triangular, and which forms a bearing for the nut or head of an inclined brace-rod. Also called *beveled washer*, but the latter term is chiefly used when the angle between the two faces is small.

**Tri-colored inspector's lamp.** Fig. 960. See *Inspector's lamp*.

**Tri-compo, or tri-composite carriage (English).** A composite coach in which separate compartments for first, second and third class passengers are provided.

**Trigger.** See *Sash-lock trigger*. 2, figs. 1659-61.

**Trimming-cap.** A *car-seat moulding*, which see. Figs. 1199-1204.

**Triple-coil nest-spring.** Figs. 2054-58, 2061, etc. See *Spiral spring*.

**Triple coupling-link.** 1, fig. 440. A kind of chain used with the *draw-hooks* of English draw-gear. Used in America for four-wheeled coal cars only.

**Triplet (of elliptic springs, which see).** Figs. 2033, etc.

**Triple-valve (Westinghouse brake).** Figs. 293, 332-3, etc. A small slide-valve which is operated by a piston, the two being contained in a suitable body or case and placed between the auxiliary-reservoir and the brake-cylinder, for admitting the air from the former to the latter, and closing connection between the brake-pipe and auxiliary reservoir when the brakes are to be applied, and for releasing it from the brake-cylinder and reopening connection between the auxiliary reservoir and brake-pipe when the air pressure is restored in the brake-pipe in order to take off the brakes.

2. (Westinghouse freight brake-gear.) 10, figs. 338-9; 11, figs. 352; 353. A special form not differing in principle from the passenger brake-valve but generally combined with the reservoir and brake-cylinder in one single part for economy and convenience of attachment.

**Triple-valve bracket (Westinghouse brake).** 28, fig. 311. A four-legged standard in the nature of a distance-piece to which the triple valve is attached.

**Triple-valve branch-pipe (Westinghouse brake).** 20, fig. 325. A short pipe by which the triple-valve is connected with the brake pipe.

**Tripping-lever (Creamer-brake, which see).** 7, figs. 263-4.

**Tripod.** 1. A three-legged stand.

2. (For lamp-shade.) Fig. 937. A cheap substitute for a *shade-ring*.

**Trough (refrigerator car).** K, figs. 130-130½.

**Truck.** 1. "A small wheel; hence *trucks*, a low carriage for carrying goods, stone, etc., either on common roads or on railroads. Indeed, this kind of carriage is often called a *truck*, in the singular."—*Webster*. The term is applied to different kinds of small vehicles used on and about stations for handling freight and baggage by hand, sometimes in a confusing sense. The usage seems to be increasing, however, to speak of baggage *barrows* and freight *trucks*, although both are sometimes designated as *barrow-trucks*, figs. 1898-1906. Four-wheeled vehicles, called *baggage wagon-trucks* and *freight wagon-trucks* are also used. Vehicles of this class are also designated as *warehouse-trucks*. Special varieties shown are the *telescope*, *swing-barrel* and *self-loading* trucks. Many others exist in limited use.

2. Figs. 1907-73. A *car-truck*, which is, mechanically, a small four-wheel (or sometimes six-wheel) car, under each end of an American car-body and carrying the latter as a dead load by means of two swiveling *centre-plates* connected by a *centre-pin* or king-bolt. The purpose of the truck is to enable short wheel-bases to be used in connection with long car-bodies. See *Car-truck*. The credit of the invention of the truck has been disputed, but it seems clear that it belongs to John B. Jervis, Chief Engineer of the Delaware & Hudson Canal Co. and of the Erie Railroad during its construction. Passenger-car trucks are nearly always of wood, although iron is in increasing use. For freight-car trucks wood has almost passed out of use except for the transoms, truck-bolsters and spring-planks, and iron is being rapidly substituted for the latter as well. The standard freight-car trucks as now built are almost invariably of the *diamond-truck* pattern, figs. 1907-40 and approximate more and more closely to the general design of the all-iron *Thielson* truck, figs. 1937-40. At the convention of the M. C. B. Association, 1884, the following were recommended as details which a standard freight-car truck should embody, and a committee was appointed to submit a design in accordance therewith to the next annual convention, viz.: 1, 5-ft. wheel-base; 2, diamond form; 3, channel-bar transoms; 4, to be adapted to either swing or rigid bolster. In respect to the swing or rigid bolster, the vote was 32 to 30 in favor of the swing-bolster.

For the price allowed for trucks by the rules for interchange of traffic, see *Freight-car*.

See also *Continuous-frame truck*. *Rigid-bolster truck*. *Swing-motion truck*.  
*Pair of trucks*.

3. (English.) American equivalent, *freight car*. This term is never used in England in the American sense, the word *bogie* being used instead. *Truck* has precisely the same meaning and application as *wagon*, which see. See *Carriage-truck*.

**Truck-bolster.** 30, figs. 1907-68. A cross timber or beam in the centre of a truck to which the lower centre-plate is fastened, and on which the car-body rests. The truck-bolster is connected to the *body-bolster* by a *centre-pin* which passes through it. The truck-bolster for a six-wheeled truck consists of a frame formed of two timbers at each end, called *spring-beams*, which rest on the springs, and one in the centre, called a *truck centre-beam*, to which the truck centre-plate is attached. All three are united together by longitudinal iron bars or wooden beams. This is represented in fig. 1970. See *Swing-bolster*.

**Truck-bolster chafing-plate** (passenger trucks). 36, figs. 1960-9. A plate attached to a swing-bolster to protect it from wear.

**Truck-bolster guide-bars** (diamond trucks). 37, figs. 1907-11, 1927-32. More commonly called *columns*. Cast-iron posts between the *arch-bars*, held in place by *column-bolts*, which form a guide for the end of the bolster. They are not used with trucks which have a swing-motion, and only with rigid-bolster trucks when the latter have bolster-springs, which latter, however, are almost universal.

**Truck-bolster guide-block.** 38, figs. 1907-11, 1927-31. A cast-iron shoe for the end of a truck-bolster, which slides vertically between the *columns* or bolster guide-bars. They are used only in connection with the latter.

**Truck-bolster jack-screws.** S, fig. 148. See *Bolster jack-screws*.

**Truck-bolster king-post.** 33, fig. 1950. See *King-post*.

**Truck-bolster truss-block.** 32, figs. 1910-1, 1927-32. See *Truss-block*.

**Truck-bolster truss-rod** (rigid-bolster trucks). 31, figs. 1907-49, etc. A rod attached near the ends of a wooden truck-bolster. In swing-bolster trucks, rods of a simi-

lar nature are used, as 24, figs. 1945-7, termed *transom truss-rods*.

**Truck-bolster truss-rod bearing.** 34, figs. 1907-42, etc.

**Truck-bolster truss-rod washer.** 35, figs. 1907-50.

**Truck centre-plate.** 63, figs. 1907-69. See *Centre-plate*.

**Truck check-chain eye.** 70, fig. 1963. See *Check-chain*. A *body check-chain eye* is also used.

**Truck check-chain hook.** 69, fig. 1963. A hook on the end of a check-chain.

**Truck details.** Figs. 1974-2180.

**Truck end-piece.** 17, figs. 1907-73. See *End-piece*.

**Truck-frame.** Figs. 1907-2030. A structure composed of wooden beams or iron bars, to which the journal-boxes or pedestals, springs, and other loose parts are attached, and which forms the skeleton of a truck. See *Continuous truck-frame*. *Truck side-frame*.

**Truck-frame king-post** (continuous-frame trucks). 18, figs. 1948-50. The iron post in the centre of the side-frame between the two pedestals.

**Truck-frame knee-iron** (passenger-car trucks). 81, fig. 1956, etc. An interior *angle-plate* of cast or wrought iron to connect the truck-frame together.

**Truck-frame queen-posts** (wooden freight-car trucks). 39, fig. 1945. Short iron columns between an upper arch-bar or wheel-piece and an inverted arch-bar, which act as distance-pieces.

**Truck knee-iron.** 81, fig. 1956, etc. See *Truck-frame knee-iron*.

**Truck-side.** A *truck side-frame*, which see.

**Truck side-bearing.** Figs. 2028-30; 61, figs. 1907-69. A plate, block, or roller attached to the top of the truck-bolster, on which a corresponding bearing fastened to the body-bolster rests. Their purpose is to prevent the car-body from having too much rocking or rolling motion. They are made of various forms, such as a plain metal plate, to protect a wooden bolster from wear, a *cup-shaped* casting to hold oil or grease and waste, and various forms of *rollers*, balls, *rockers*, studs, and the like. See the names in italics.

**Truck side-frame.** Figs. 1907-2030. The longitudinal portion of a truck-frame, on the outside of the wheels, which extends from one axle to the other and to which the journal-boxes and bolsters or transoms are attached. See *Diamond-truck side-frame*, in designating which the term is chiefly employed.



**Trunnion.** The pivot upon which any body, as a gun, revolves. The term is usually applied to bearings for objects of irregular shape, and having slow or irregular motion, as distinguished from the *journals*, of wheels, etc. See *Leader-trunnion*, 15 and 51, figs. 1821-4. *Ladder-trunnion*, 32, figs. 1821-4. *Uncoupling-lever trunnion-plate*, 21, figs. 636, 640.

**Truss.** Figs. 2181-8, etc. A frame to which rigidity is given by uniting the parts so that its figure shall be in effect cut up into triangles, making it incapable of distortion by turning of the bars about their joints. The simplest form of truss is that in which a *truss-rod* and *king-post* are put underneath a beam to strengthen it, as in fig. 2181, or two beams are framed together in the form of a letter A, and tied together at their lower ends by a rod or another beam, as shown in fig. 2182. These are called *king-post trusses*. Another form is that in which two posts are used, as shown by figs. 2183-4, which are called *queen-post trusses*. This is not a perfect truss, since it is capable of altering its shape by simply bending without rupturing its parts, when unequally loaded. In order to prevent this, *counterbraces* 11 and 9 are added. The extension of the principle of the truss represented by fig. 2183 by the addition of more posts, gives the well-known form of truss known as the *Pratt* or *Whipple truss*, represented by fig. 2185, in which all the braces are subjected to strains of tension and the posts to compression. The extension of the same principle represented in fig. 2184 gives the well-known *Howe truss*, fig. 2186, in which the braces are subjected to strains of compression and the vertical members to tension. As cars are not so unequally loaded as bridges, the trusses used in car-frames usually have braces which incline in one direction only, from the centre to the point of support, as shown in figs. 82-185.

The *Warren* or *triangular truss*, figs. 97-101, recently introduced into car-building, has all its web-members (parts within the chords) inclined at an equal angle.

The *Challender truss*, which see, fig. 185 b, is a kind of *plate girder*. See *Girder*. See also *Bastard Howe*. *Bastard Pratt*. *Framing*. *Bunk truss* (of logging cars), fig. 1789.

**Truss-arch** (passenger car framing). Fig. 645. See *Framing*, etc.

**Truss-beam** (Miller platform). 22, figs. 636-8. See *Platform truss-beam*.

**Truss-block.** 4, figs. 2187-8. A distance-piece between a truss-rod and the compression member of a trussed beam, which forms a bearing for both. See *Body-bolster truss-block*. *Transom truss-block*. *Truck-bolster truss-block*. Figs. 215-26, 1907-73.

**Trussed brake-beam.** 4, figs. 245-6, 250-1.

**Truss-plank** (passenger-car frames). 63, figs. 155-85; 1, fig. 695. A wide piece of timber bolted to, and usually locked into, the posts on the inside of the car immediately above the sills.

A substitute for the truss-plank and body truss-rod at once is the *Challender truss*, which see, fig. 185b. The *end truss-plank*, 32, fig. 186, is a continuation of the latter across the ends of the car, for uniformity of finish.

**Truss-plank cap.** 64, figs. 175-6. A strip of wood attached to the top of a truss-plank between the seat-frames.

**Truss-rod.** 1, figs. 2181, 2187-8, etc. An inclined rod used in connection with a king or queen-post truss, or trussed beam, to resist deflection. It is attached to the ends of the beam, and is supported in the middle by a *king-post*, *truss-block*, or two *queen-posts* between the beam and the rod. A substitute for the body truss-rod as well as for the truss-plank and body-brace rods of an ordinary car-frame is the *Challender truss*, fig. 185b, which see. Various forms of truss-rods are the following, which see:

<i>Body bolster truss-rod.</i>	<i>Derrick truss-rod.</i>
<i>Body truss-rod (centre and outside).</i>	<i>Hand-car truss-rod.</i>
<i>Brake-beam truss-rod.</i>	<i>Inverted body-truss-rod.</i>
<i>Cross-frame, or needle-beam truss-rod.</i>	<i>Platform truss-rod.</i>
	<i>Safety-beam truss-rod.</i>

2. (Cabin of pile-driver car.) 37, fig. 1822. Oblique rods parallel with the braces, connecting the swinging-platform sills with the top-stringers.

**Truss-rod bearing.** 3, figs. 2181, 2187-8, etc. A bearing used to furnish support to a truss-rod, at an angle or bend in the latter, as

*Body truss-rod bearing*, 179, figs. 93-6, etc.

*Body-bolster truss-rod bearing*, 5, fig. 215.

*Truck-bolster truss-rod bearing*, 34, figs. 1907-42.

The bearing over the bolster of a long body truss-rod running from end-sill to end-sill is called a *body truss rod saddle*, pro

ably in part from its form. A distinction has been attempted between a *truss-rod bearing* and a *truss-rod saddle*, founded upon the direction of the strain which it resists, and this distinction has been preserved in figs. 2181-8 of this edition. It cannot, however, be said to be founded on usage, either of bridge builders or car-builders, except in respect to the *body truss-rod saddle*, as above stated.

**Truss-rod iron.** 24, figs. 159-67. A bar of iron, having an eye, to which a *body truss-rod* is attached, bolted to the under side of a sill below a *body-bolster*. It is an imperfect form of attaching *body truss-rods* almost out of use for freight cars and in decreasing use for passenger cars.

**Truss-rod saddle.** See note to *truss-rod bearing* and *body truss-rod saddle*, 20, figs. 88-138; 21, fig. 155, etc.

**Truss-rod washer.** 2, fig. 2181. A large flat or beveled washer, used under a nut on the end of a *truss-rod*. Sometimes called a *skew-back*. See *Body-bolster truss-rod washer*. *Truck-bolster truss-rod washer*.

**Tubed oil-screws.** Fig. 911. See *Oil-screws*.

**Tubular car.** A form of car construction recently introduced which consists in constructing the sills and floor-framing of iron gas-pipe. The plan has not yet come into general use, nor are its merits as yet generally admitted.

**Tubular lantern.** Figs. 983-4. A lantern having no guards except a rectangular frame of tubes through which the air-supply is also carried. They are in two forms, with *shade reflector* and *square or side reflector*.

**Tubular square lamp.** Fig. 908. See above.

**Tufting button.** Fig. 1230. A button used in upholstery to hold the cord which passes through the upper covering of the upholstered surface, dividing it up into squares or diamonds, producing the effect shown in the seats in figs. 212-3. Car-seats in general are not tufted.

**Tumbler.** 1. A drinking-glass.

2. (Foundry). A machine for cleaning castings, locomotive tubes, etc. It consists of a case mounted on a shaft on which it is made to revolve. The articles inside of the case are cleaned by their attrition against each other and the case.

3. (Locksmithing.) Figs. 1029-37, etc. "A latch engaging within a notch in a lock, bolt, or otherwise, opposing its motion until it is lifted or arranged by the key so as to remove the obstacle."—*Knight*. In the *Yale lock*, fig. 1028, the tumbler is simply a pin cut in two,

which, when the proper key is inserted, is raised to such a point that the joint of the tumbler comes exactly opposite the joint of the escutcheon, permitting the same to revolve.

**Tumbler-dog** (Miller's padlock). C, figs. 1036-7. A catch to hold the hasp locked except when it enters the tumbler.

**Tumbler-holder.** Figs. 1575-6. A bracket or stand for holding glass tumblers or drinking cups. They are either *single* or *double*.

**Tumbler-spring** (Miller's padlock). F, figs. 1036-7.

**Turnbuckle.** Figs. 1881-3; 23, figs. 155-85; B, figs. 1087-9; 28, figs. 363-5, etc. A device inserted in the middle of a long rod for changing its length. *Right and left screw turnbuckles*, or *single screw turnbuckles*, figs. 1881-2, are the most common, but *pipe* or *tube turnbuckles*, fig. 1883, have been shown to give the greatest strength for the same weight as well as the neatest outside appearance.

**Turn-under** (English). See *Fall-under*.

**Twin door-panels.** 10, fig. 370; fig. 1845. A pair of panels side by side in a door, formed by inserting a *parting-rail* into a wide panel.

**Twin-washer.** Fig. 1875. A *double-washer*, which see.

**Twin-window.** 138, figs. 161-8. Two small and rather narrow windows placed side by side. The tendency is to abandon the use of all such irregular forms.

**Twisted flat wire** (for car seals, which see). Fig. 1118. A form adapted to prevent the possibility of the lead seal being stripped from the wire and afterwards replaced upon it.

**Two-group spiral springs.** Figs. 2067-72, 2095-6, etc. See *Spiral springs*.

**Two-horse street car.** Fig. 1837. The most common form of *street car*, which see.

**Two-light centre-lamp.** Figs. 834, etc. See *Centre-lamp* and *chandelier*. The majority of centre-lamps as now constructed are two-light burners.

**Two-spring slip-burner.** Fig. 881. See *Slip-burner*.

**Tyler-brake** (street cars). Fig. 229. A simple form of brake-gear for applying outer-hung brakes from either platform. The pressure upon the brake-beams is not equal.

**Tyre** (of a wheel). See *Tire*.

The spelling "tyre" is the English method and cor-



responds with the supposed origiu of the word, which is from the fact that iron bands were first used on wheels in the city of Tyre, Syria.

## U

**U-bolt.** Fig. 1870. A double bolt made of a bar of iron, bent in the shape of the letter U, with a nut and screw on each end. See *Brake-hanger carrier*. *Stake-pocket U-bolt*.

**U-hanger.** 102, fig. 1959. A U-shaped strap fastened over the end of a half-elliptic spring. See *Spring-hanger*. A *T-hanger* is one with a T-headed bolt passing through a slot in the end of the spring. Not used in car construction.

**Umbrella-rest** (for cuspidor). Fig. 811. Small tubes used in connection with cuspidors having large mats, as a means for holding umbrellas upright for drainage.

**Uncoupling-chain** (Miller coupler). 16, fig. 640. See below.

**Uncoupling-lever** (Miller coupler). 15, fig. 640-1. A lever attached to the platform of a car, and connected by the *uncoupling-chain* with the coupling-hook or drawbar, to disengage or uncouple it from the one on the adjoining car. It is fulcrumed in an *uncoupling-lever trunnion-plate* fastened under the platform end-timber, and passes through a hole in the latter, which is reinforced above by the *uncoupling-lever plate*. The *uncoupling-lever wedge*, attached to the platform by the *uncoupling-lever wedge-chain* is inserted in this plate to hold the lever in either one of its extreme positions. An *uncoupling-lever ratchet* on the platform railing holds the lever in any desired position.

In the Janney draw-gear the equivalent of the uncoupling-lever is called the *platform-lever* and in the Cowell the *compression-lever*.

**Uncoupling-lever plate.** 18, figs. 640-1. See above.

**Uncoupling-lever ratchet.** 17, fig. 637. See above.

**Uncoupling-lever trunnion-plate.** 21, figs. 636, 640. See above.

**Uncoupling-lever wedge.** 19, fig. 640. See above.

**Uncoupling-lever wedge-chain.** 20, fig. 640. See above.

**Under-frame** (English). 1-21, figs. 116, 119, 204, 207; 88 90, figs. 204, 207. American equivalent, *floor*. A stout framework chiefly composed of timber, which re-

ceives the buffing and drawing strains, maintains the wheels in position and carries the weight of the floor and body of the vehicle. In vehicles for freight (*goods*) traffic the under-frame and body are rigidly connected (see figs. 116-9) and mutually stiffen and strengthen one another; but in passenger vehicles (see figs. 204-7) the body is framed as an independent structure, and merely rests on the under-frame, rubber pads (*India-rubber body-cushions*) being interposed to deaden shocks. The only connection is through a *body holding-down bolt*, which see. The line of draught and buffing passes through the centre of the horizontal plane, in which all the members of the under-frame lie.

**Under-frame plate** (English). See *Spider-plate*.

**Under-hung door.** A sliding-door which is supported and slides on a rail below the door. The door in fig. 82 is under-hung, but *over-hung* doors, especially with anti-friction *car door-hangers*, are increasingly preferred.

**Union** (pipe-fittings). A *union-joint*, which see.

**Union-joint** (pipe-fittings). Fig. 1343; 14, 35, 41, etc. figs. 293-9. A means of uniting the ends of two pipes with a nut. The latter is attached to one pipe with a collar, and is screwed on the opposite pipe, or on a thimble attached to the pipe. Often called simply a *union* or *coupling*. They are largely used for all forms of pipe work, and take their distinctive names, if any, from the parts with which they are connected, as *drain-pipe union*, *reservoir union*, etc., of Westinghouse brake.

**"Unique" sun-hinge burner.** Fig. 885. See *Sun hinge burner*.

**United States automatic car-coupler.** Fig. 418. One of the freight-car couplers recommended for further test by the M. C. B. Association. It uses an ordinary loose link. See *Automatic freight-car coupler*.

**United States standard system of screw-threads.** This term is often used to designate the *Sellers system of screw-threads*, which see.

**Universal joint.** 1. "A device for connecting the ends of two shafts so as to allow them to have perfect freedom of motion in every direction within certain defined limits."—*Knight*. An application in car building which has not yet secured general use is as a substitute for brake-hose, in connection with air-brake apparatus.

2. Fig. 1768. A sort of hemispherical or cup-like form for two bearing surfaces, so as to permit them to move

upon each other in any direction. The steam pipes of locomotives are connected with a joint of this kind, and it is the purpose of the modification of the form of centre-plates shown in figs. 1930, 2107-9.

**Universal shade-ring.** Fig. 939. A shade-ring, which see, so constructed as to be of adjustable diameter.

**Upholstery.** In passenger-car construction, the cushions, curtains, carpets, beds, etc., and generally the material from which they are made.

**Upholstery details** (of seats). Figs. 1205-1230. See also *Sleeping-car furnishings and details*.

**Upper-bearing** (swing link-hanger, which see). 6, figs. 2110-1.

**Upper bell-crank bracket** ("American" automatic compression brake). 13, figs. 368-9. See *Compression-brake*.

**Upper bell-crank rod.** 14, figs. 368-9. See *Compression-brake*.

**Upper belt-rail** (passenger car exteriors). 82, figs. 175-6; 44, figs. 1843-4. A horizontal bar attached to the posts on the outside and above the windows.

**Upper-berth.** 2, 3, figs. 676-9. The top berth in a sleeping-car section. It folds up by day against the roof, being secured by a *berth-latch* or *safety berth-latch*, leaving a pocket above it in which the head-board, two thin mattresses and the bedding are stored. See *Berth*. In the Mann boudoir cars, the upper berth, **B**, figs. 680-1, is the sofa-back by day.

**Upper-berth bracket.** Fig. 1236. A form of *upper-berth rest* closely resembling a bracket.

**Upper berth-curtains** (Mann boudoir car). 12, figs. 680-1. See *Berth-curtain*.

**Upper-berth hinge** (Mann boudoir car). **F**, fig. 680-1. A hinge at the top of the sofa-back by which the latter is lifted up into position to form the upper berth. The outside edge is supported on the *upper-berth rest*, 12, fig. 681.

**Upper-berth pocket.** 33, figs. 678. A pocket against the sides of the car which closes up flush therewith when the upper berth is folded up, but drops open when the berth is made up, so as to afford a receptacle for clothing and baggage. Similar pockets for the lower berth are carried on the head-board and are called *head-board pockets*.

**Upper-berth rest** (sleeping cars). Figs. 1235, 1244.

metal lug, or shelf, which supports an upper-berth when lowered.

2. (Emigrant sleeping-cars.) **L**, figs. 682-5, 1293. An attachment for leaving the upper-berth partially open by day for ventilation. Another upper-berth rest **M** is attached to the *berth-post*.

**Upper-berth rest** (Mann boudoir cars). 12, fig. 681. See *Upper-berth hinge*.

**Upper-berth-rest pivot.** Fig. 1234. A pin attached to a plate fastened to an upper-berth. The pin engages in a hole in a *berth-rest*, which see.

**Upper-berth-rest plate** (Mann boudoir cars). 11, figs. 680-1. A plate permanently fastened to the window-frame to carry the *upper-berth rest*.

**Upper brake-shaft bearing.** 96, figs. 82-143; 156, figs. 155-85. A eye by which the upper end of a brake-shaft is held in place. In passenger and street cars, usually attached to the hand-rail; on freight box-cars, when the brakes are operated from the roof, to the end of the body near the top.

**Upper-cap** (triple-valve of Westinghouse brake). 4, figs. 332-3.

**Upper corner-plate.** 55, figs. 82-142. See *Corner-plate*.

**Upper (or top) cylinder-head** (Westinghouse driving-wheel brake-cylinder). 5, figs. 314-5. See *Cylinder-head*.

**Upper deck** (passenger cars). 110, figs. 155-85, etc. Also called *clear-story*. The raised central portion of the roof. See *Deck*.

**Upper-deck carline.** 8, fig. 186; 118, figs. 155-85. Carlines, which see, passing from side to side of the upper deck only, resting on the *deck-plate*. Usually called simply *deck carline*.

**Upper-deck eaves-moulding.** 119, fig. 174, etc. A moulding, usually called simply *deck eaves-moulding*, on the outside edge of the roof.

**Upper deflector** (Gouge heater). Fig. 1447. A part to cover the opening in the deflector-end of case. See *Deflector*.

**Upper diaphragm case** (engine signal-valve. Westinghouse train-signal apparatus, which see). 3, fig. 690. See also *Diaphragm*.

**Upper discharge-valve** (air-pump for Westinghouse brake). 30, fig. 298; 32, fig. 299. A puppet-valve at the top of



the air-pump cylinder through which the compressed air above the piston passes.

**Upper door-hinge** (English). 178, fig. 205. See *Door-hinge*.

**Upper door-sash**. 12, fig. 370. The part of a double window-sash in a car door which covers the upper part of the opening. This upper section is usually made movable, so that it can be lowered for ventilation.

**Upper end-panel** (street cars). 29, fig. 1845. See *Panel*.

**Upper-floor** (stock car, which see). 28, figs. 131-8, etc. More commonly, *double-deck*.

**Upper-platform** (pile-driver car). 27, figs. 1821-4. The floor of the *swinging-platform*, which see. See also *Pile-driver car*.

**Upper-rail** (sliding doors). Fig. 372. Usually called *top door-rail*. A guide-rail above doors which are supported upon rollers at the bottom, or one carrying a door suspended upon *door-hangers*. See *Door-rail*.

**Upper seat-back rail**. 41, figs. 1843-4. See *Seat-back*.

**Upper steam-valve** (engine of Westinghouse brake). 7, fig. 298; 14, fig. 299. See *Main steam-valve*. The upper steam-valve is smaller than the lower.

**Upper steam-valve bushing** (engine of Westinghouse brake). 25, fig. 298; 17, fig. 299.

**Upper swing-hanger pivot**. 47, figs. 1912-69, figs. 2110-11. See also *Lower swing-hanger pivot*.

**Upper wainscot end-rail** (passenger car interiors). 26, fig. 186. See below.

**Upper wainscot-rail**. A longitudinal wooden bar or rail, fastened to the posts immediately under the window. 75, figs. 175-6; 3, figs. 693-5. See *Wainscot-rail*.

**Upper window-blind**. 17, fig. 692; 86, figs. 169-71. See *Window-blind*.

**Upper window-blind lift**. 25, fig. 692; fig. 1674. Distinguished from a *lower window-blind lift* in not having a lug or ledge. See *Window-blind lift*.

**Urinal**. 132, figs. 156, 170, 182; figs. 1100-5. A metal or porcelain receptacle used in saloons, connected to a pipe leading through the floor. They are distinguished as *corner* or *side* urinals, the former almost invariably used in car work. A *concealing* urinal, which see, shutting up flush with the wood work when not in use, is sometimes used.

**Urinal-cover**. A wooden or sheet-metal lid for inclosing a urinal.

**Urinal-drip, or drip-pan**. Fig. 1103. A pan under a urinal on the floor.

**Urinal-pipe**. Fig. 1103. See *Urinal*.

**Urinal-handle**. Figs. 1106-7. A handle in a saloon, placed above the urinal to hold on to. They are distinguished as *corner* or *side urinal-handles*, according to their position on the side of the car.

**Urinal-safe** (parlor-car water-closets). Figs. 1087-89. A plate covering the top of the bowl to prevent nuisance in the inclosed parts.

**Urinal-ventilator**. Fig. 1102. A pipe attached to a cap on a urinal, communicating with the top of a car, where some form of *wind-scoop* is often added.

"**Utility**" double-acting spring-hinge. Fig. 788. See *Double-acting hinge*.

"**Utility**" tail-light. Fig. 963. See *Signal-lamp*.

## V

**Vacuum-brake**. Figs. 266-92. A system of continuous brakes which is operated by *exhausting* the air from some appliance under each car by which the pressure of the external air is transmitted to the brake levers and shoes. So called in distinction from *air-brakes*, which see, which are technically understood to refer only to brakes operating with compressed air, although in a literal sense the vacuum-brake is also an air-brake. An *ejector* on the engine is ordinarily used for exhausting the air, connected with the rest of the train by pipes and flexible hose between the cars. The only vacuum brakes in use in this country are the *Eames vacuum-brake* and *Smith vacuum-brake*, which see, and those only to a limited extent.

**Valve**. A lid, cover, or plug for opening and closing an aperture or passage.

See *Brake-hose coupling-valve*.

*Check-valve*.

*Conductor's-valve*.

*Coupling-valve*.

*Discharge-valve*.

*Double check-valve*.

*Lower discharge-valve*.

*Lower steam-valve*.

*Receiving-valve*.

*Reversing-valve*.

*Safety-valve*.

*Signal-valve*.

*Slide-valve of triple-valve*.

*Steam-valve*.

*Tank-valve*.

*Throttle-valve*.

*Top-plate valve*.

*Triple-valve*.

*Upper discharge valve*.

<i>Recipient filling-valve.</i>	<i>Upper steam-valve.</i>
<i>Recipient-valve.</i>	<i>Ventilator-valve.</i>
<i>Register-valve.</i>	<i>Water-cooler valve.</i>

**Valve-chain** (of injector-pipe, Gouge heater). 76, figs. 1413-4. The means for regulating the valve to control the supply of air.

**Valve-key** (Pintsch gas-lighting apparatus). Fig. 823. A key for opening all the high-pressure valves, the *lamp-key*, fig. 823, being used for the low-pressure valves connected with the burners.

**Valve-knob** (Eames dividing attachment). 62, figs. 274-5. The knob for operating the valve.

**Valves** (for top-plate of Spear heaters). Two semicircular dampers.

**Valve-seat**. "The flat or conical surface on which a valve rests."—*Knight*. See *Discharge-valve seat*. *Tank-valve seat*.

**Valve-shell** (upper and lower, "American" steam brake-valve). 1-2, figs. 360-2.

**Valve-stem**. A rod attached to a valve, and by which the latter is moved, is always called a *valve-stem*. See "American" steam brake-valve, 6, figs. 360-2. *Eames dividing attachment*, 63, figs. 274-5. *Howard's parlor-car water-closet*, figs. 1087-89. *Westinghouse pump governor*, 9, fig. 316, etc. See also *Reversing-valve stem*.

**Valve stem nut** ("American" steam brake-valve). 7, figs. 360-2. The nut fastening on the handle.

**Van** (English). A comprehensive term for any covered vehicle not used for conveying ordinary passengers or ordinary freight. See *Brake-van*. *Bullion-van*. *Guard's-van*.

**Van Lieuw grain-door**. Figs. 377-82. One of the numerous devices for speedily removing and returning to place a grain-door. It consists principally of *stanchion guide-rod F*, standing in the *guide-rod socket* generally, on which a *stanchion 3*, attached to a *stanchion socket 2*, freely slides. The latter is attached to the grain-door. The door is locked into place by the *lug I*, confining it to the *grain-door guide O*. When not in use it is confined in a vertical position by the *floor-stop g*, and the *side-stop H*.

**Varnish**. A "liquid-glass" for covering paint or wood-work. See *Finishing varnish*.

**Veneer**. A thin leaf of a superior wood for overlaying

an inferior wood."—*Webster*. See *Ceiling-veneers*. *Perforated-veneer*.

**Vent**. "A small aperture; a hole or passage for air or other fluid to escape."—*Webster*. See *Lamp-vent*.

**Ventilating head** (Gouge heater). Fig. 1440. See *Head*.

**Ventilating jack** (for saloons). Figs. 1092-4. Also called *wind-scoop*. A flaring horizontal tube, constituting a simple form of the ventilating devices which use the current produced by the motion of the cars to cause an exhaust current of air. See *Wind-scoop*. *Injector*, etc.

**Ventilator**. Figs. 1553-63. Also figs. 1603-33; and 116, 142, 143, figs. 155-85. A device for admitting or exhausting air to or from a car. Ventilators according to their position are designated as *deck ventilators* (end or side), *end ventilators*, *fricze ventilators*, etc. They are often designated, sometimes without truth, as *automatic* or *self-acting*. The prominent forms of the latter varieties are shown in figs. 1557-61. See also the various wind-scoops shown with car-heaters and saloon furnishings. An exhaust-ventilator, for saloon-hoppers, attached to the under side of cars (*Bell's exhaust*, which see), is shown in figs. 1097-8. Ventilators for boarding cars, tool cars, work trains, etc., are also put in the floor, a trap-door being placed there provided with gratings underneath. Among the prominent ventilators are the *Globe*, *Excelsior*, *Creamer ventilator-plate*, etc., which see. The proper system of ventilation for passenger cars is still a mooted question. The supply of air required for each person, for good ventilation, is at least two cubic feet per minute.

The ventilation of the Mann boudoir cars is very elaborate, and perhaps the most perfect now in use. No air is intended to be admitted within the car by the windows or otherwise, except through an in-take or wind-scoop. The air thus collected is forced downward into the bottom chamber over the ice and filter closet, where it first passes through a quantity of "Excelsior" mattress packing or other fibrous mass, loosely held up on pins and moistened by the melted water from the ice, through and around which the cleansed air then passes and then enters the *heater-room*, where in winter it is heated and in summer escapes cooled through a flue extending the length of the car down the corridor, into which it is discharged by a series of registers oppo-



site the several doors of the boudoirs, which being lowered admit it to the latter. In this flue are three steam-pipes to further heat the air in winter. Suction ventilators in the roof of the several compartments and corridor are used to exhaust the air, thus keeping up a continual circulation. The capacity of the ice-chest is 600 lbs. In summer the full amount of ice is used per day and effects a lowering of the temperature of about ten degrees. In winter only sufficient ice is used to moisten the filtering "Excelsior."

2. (For fruit car.) **D**<sub>4</sub>, figs. 121-5. A system of slats protected by netting at each end of the car, so arranged as to enable the ventilators to be readily opened or closed from the outside. The names of the various parts are given in connection with figs. 121-5.

3. (Spear heater.) Figs. 1486-88, 1526-7. A large wind-scoop.

**Ventilator-arm.** Fig. 1630. A small attachment carried on deck-sashes, especially of street cars, for holding them open.

**Ventilator-cowl** (English). See *Ventilator hood*.

**Ventilator-cap** (for urinals). Fig. 1102.

**Ventilator-deflector.** 1, figs. 1556-7, 1568-9. A metal plate or board placed in such a position at a ventilator opening that it will cause a current of air to flow into or out of the car when the latter is in motion. Another form, used in windows to produce an exhaust draft when opened, is a mere loose board with a notch to receive the lower edge of the window-sash. See *Deflector*.

**Ventilator-door.** Figs. 1554-69. A door for closing the aperture of a ventilator. See also *Ventilator valve*.

**Ventilator fixed-panel** (English). 136, figs. 204-5. The outer panel in a ventilator composed of two perforated panels, one being capable of being slid over the other so that the perforations coincide or become covered. This form of ventilator is used in English cars to the exclusion of any other. See also *Ventilator hood* and *ventilator sliding-panel*.

**Ventilator-heater.** Figs. 1405-71. See *Gouge heater*. The Gouge, perhaps, pays the most elaborate attention to ventilation of any heater and it is the only one embodying that word in its name, but nearly all the hot-air heaters endeavor to be more or less entitled to this name.

**Ventilator-hood.** 2, fig. 1569. A shield over the outside

of a ventilator to prevent the entrance of sparks, cinders, rain, or snow. It is sometimes intended to direct the current of air either into or out of the car. See also *Deck end-ventilator hood*.

2. (English.) 134, figs. 204, 205. Also called *ventilator-cowl*. A shield made of either wood or metal, preventing the entrance of rain or cinders.

**Ventilator-netting** (fruit cars). **D**<sub>4</sub>, figs. 121-5.

**Ventilator-opener.** See *Deck-sash opener*, figs. 1603-26.

**Ventilator-panel.** 116, figs. 158, 173, 184, etc. A panel in the frame of a valve or door for closing the aperture of a ventilator.

**Ventilator-pivot.** A pin on which a ventilator door or sash is swung or hinged. It is the same as a *deck-sash pivot*, fig. 1611. See also (for fruit car) **F**<sub>3</sub>, figs. 121-5.

**Ventilator pivot-plate.** The same as a *sash-lock plate* or *stop*, figs. 1655-7.

**Ventilator-plate.** See *Frieze ventilator-plate*, figs. 1562-3.

**Ventilator-register.** Fig. 1553. A metal plate or frame attached to a ventilator opening, provided with slats arranged so as to turn and thus either open or close the ventilator. They are chiefly used as *frieze-ventilators*, but sometimes elsewhere. In sleeping cars they are often combined with berth curtain-rod brackets, as in fig. 1272.

**Ventilator-ring.** Fig. 1555. A metal ring attached to the ceiling of a car around an opening for a ventilator in the roof. Seldom used now.

**Ventilator-sash.** 116, figs. 155-85. Usually a *deck-sash*.

**Ventilator sliding-panel** (English). 135, figs. 204-5. Part of a ventilator in which there are two perforated hard-wood slides, the outer fixed, the inner movable, so as to make the perforations coincide or be covered. See *Ventilator-hood* and *ventilator fixed-panel*.

**Ventilator-staff.** Fig. 1556. A *pull-hook* or *deck-sash opener*.

**Ventilator-stop** (street car). A small metal bracket on which a ventilator-sash rests when open. Same as fig. 1864.

**Ventilator-valve.** 116, figs. 155-85, etc. A door for opening or closing the aperture of a ventilator, usually made to turn on pivots at or near its centre. See *Deck-sash pivot*.

**Vertical telegraph cock, or faucet.** Fig. 1595. See *Telegraph cock*.

**Vestibule** (parlor and sleeping cars). Figs. 210, etc. The part of the car nearest the door, cut off from the main saloon by an interior door. It is occupied by the saloon, washing and heating arrangements, etc. Its purpose is to give protection to the interior of the car against drafts and noise.

**"Vienna" lamp-shade.** Fig. 946. See *Lamp-shade*.

**Volute spring.** Fig. 2052. A spring made of a flat bar of steel coiled with a kind of scroll resembling the volutes used as an ornament in the capitals of ancient Roman and Grecian architecture. The coil is made in a conical form, so that the spring can be compressed in the direction of the axis around which it is coiled. They are now little used in this country, but largely in Europe.

**Vose graduated-spring.** Fig. 2045. A round-bar single-coil spiral-spring, with two conical india-rubber springs on the inside. Now little used, all-steel springs by the same inventor and others having supplanted it. See *Graduated spring*.

**V-shaped screw-thread.** Fig. 1827. A thread with a sharp edge at the top and sharp groove at the root. The Sellers (U. S.) standard thread, fig. 1829, is flat at the top and at the root, and the Whitworth, fig. 1829, is rounded at those points. V-threads are now used chiefly for pipe-threads.

**Vulcanized fibre.** A leathery material of great durability and toughness, which is made by subjecting various kinds of vegetable fibre to the action of acids. It is insoluble in all ordinary solvents, such as oil, alcohol, ether, ammonia, etc. It is made in two classes, *hard* or *flexible* (the former being that used generally in car construction for the dust-guards of journal-boxes, fig. 2018), and in sheets from 16 to 24 in. wide by about 50 in. long and from  $\frac{1}{32}$  in. to  $\frac{1}{4}$  in. thick. Another name for the same article is *gelatinized fibre*.

**V window-button.** Fig. 1652. A catch, with a V-shaped notch in the end, fastened to a window-post to hold up a window. Little used.

## W

**Wagon, or goods wagon** (English). Figs. 116-119. American equivalent, *freight car*. A vehicle (always four-

wheeled), used to convey any sort of merchandise, minerals or live stock, and run on freight trains. *Truck* is a synonymous term largely used.

See <i>Ballast wagon</i> .*	<i>High-sided wagon</i> .*
<i>Batten wagon</i> .*	<i>Low-sided wagon</i> .*
<i>Boiler wagon</i> .*	<i>Medium-sided wagon</i> .*
<i>Box wagon</i> .	<i>Open wagon</i> .*
<i>Cattle wagon</i> .	<i>Rail wagon</i> .*
<i>Covered wagon</i> .	<i>Timber wagon</i> .*
<i>Goods wagon</i> .	

Wagons marked thus \* are *open wagons* (*gondola cars*), having no roof.

**Wagon-coupling, or draw-chain** (English). 41, 42, figs. 116, 118. The draft coupling universally used on freight cars (*goods wagons*) in England in connection with a *draw-hook*, which see.

**Wagon-sheet** (English). See *Tarpaulin*.

**Wagon-truck.** Fig. 1898. A four-wheeled vehicle for moving baggage or freight about a station or warehouse. See also *Baggage wagon-truck*, fig. 1902. *Freight wagon-truck*, fig. 1899. Two-wheeled vehicles of the same kind are known as *baggage-barrows* and *freight-trucks*, both sometimes designated as *barrow-trucks*.

**Wagon-wheel** (English). Figs. 2165, 2180. See *Wrought-iron wheel*. *Steel tired wheel*. These engravings give the almost universal standards for English freight service.

**Wainscot-panel.** 76, figs. 155-85; 4, figs. 692-5; 28, fig. 186. A board which forms a panel under the windows between the two *wainscot-rails*.

**Wainscot-rails** (passenger car interiors). 74, 75, figs. 159-60, 175-6; 2, 3, figs. 694-5; fig. 186. Longitudinal wooden strips fastened to the posts and extending from one end of the car to the other. The *lower wainscot-rail* comes immediately above the truss-plank; the *upper wainscot-rail* is immediately under the window. The *wainscot end-rails*, 26, 30, fig. 186, are the wainscot-rails at the end of the car.

**Waist-panel** (English). 124, fig. 205. The panel immediately above the lowest panel on the outside of a carriage body.

**Waist-rail** (English). 100, figs. 204-5. A horizontal piece in the framing of the side of a passenger carriage.

**Wall seat-end.** 4, figs. 1120-2. The seat-end next the wall or side of a car, so called in distinction from the *aisle seat-end*.

**Wards** (of a lock). 5, figs. 1031, etc. The interior circular



ridges which fit into corresponding recesses in the *bit* of a key (the latter also termed *wards*), the surrounding solid parts of the bit being called the *web*.

**Warehouse-truck.** Figs. 1898-1906. A small vehicle which is used for moving freight about a warehouse. See *Barrow-truck*. *Wagon-truck*.

**Wash-bowl, or wash-basin.** 2, fig. 1570. A *basin*, which see. They are used in sleeping and drawing-room cars, and generally form a part of a fixed wash-stand.

**Wash-bowl pipe.** 4, fig. 1600. A waste-pipe.

**Washburn-wheel.** Figs. 2124-5. A cast-iron car-wheel, designed and patented by Nathan Washburn in 1850, and now more used, perhaps, than all other forms put together. It consists of two plates, which extend from the hub to about half the distance between it and the rim. There they unite into one plate which extends to the rim. The plates are all curved so as to contract when the wheels are cooled without danger of fracturing the wheel. The single plate and the rim are united together and strengthened by curved ribs cast on the inside of the wheel.

**Washer.** 1. Fig. 1873, etc. A plate of metal or other material, usually annular, which is placed under a nut or bolt-head to give it a better bearing. Two or more washers are sometimes combined and called *washer-plates*, *strap-washers*, *double* or *twin* washers, *triple* washers, etc., as fig. 1875, and are sometimes made *beveled* or *triangular*, figs. 1874-7, for a rod or bolt which is oblique with reference to the bearing surface. A *socket-washer* or *flush-washer* is one provided with a recess for the bolt-head so as to leave it flush with the surface of the adjoining parts. *Cut* washers or *wrought* washers are those stamped out of rolled iron plates. *Cast* washers are made from cast-iron. Both are largely used. Washers in car work all take their name from that of the bolt or rod to which they are attached, except the *base-washer*, which stands at the base of the platform-posts on passenger-car platforms. A *gasket*, which see, is sometimes called a washer, as figs. 824-5.

2. A brush for washing objects, as *car-washer*, fig. 1879.

**Washer-plate.** A *strap-washer*, which see.

**Wash-room.** Figs. 203-14. A compartment which constitutes the *vestibule* of ordinary parlor and sleeping cars, provided with toilet facilities. In private and offi-

cers' cars it is placed in various irregular positions to leave the ends of the car free.

**Wash-room furnishings.** Figs. 1570-90.

**Wash-room pump.** Figs. 1570-1. More properly *basin-pump*, which see. They are either *single* or *double-acting*.

**Wash-stand** (postal cars). Fig. 1065. A cast stand carrying a basin. They are distinguished as corner or side wash-stands. They are used in ordinary passenger cars.

**Wash-stand sink.** 3, fig. 1600. A cast-iron plate with one or more bowls, made in one piece and lined with porcelain and used for the top of a wash-stand. Used only in second-class cars.

**Wash-stand slab.** 3, fig. 1570. A stone slab which forms the top for a wash-stand. Commonly, simply slab.

**Waste.** The spoiled bobbins of cotton mills, used for wiping machinery and for *journal-packing*, which see. Although valueless for the manufacture of cloth, the consumption is so large that waste is quite expensive. A cheaper substitute for use as journal-packing is *patent-waste*, which see.

**Waste-cock.** 1. (Searle and Baker heaters.) H, fig. 1434-5. A cock attached to the *expansion-drum* or *circulating-drum* of the Baker heater, for drawing off or changing the water in the heater-pipes.

2. (For tank water-cooler.) Figs. 1573-5.

**Waste-pipe stud** (Westinghouse pump-governor). 6, figs. 316.

**Water-alcove.** 134, figs. 169-182; figs. 1594-4½. A recess in the side of a partition of a passenger car to receive the faucet of a water-cooler or water-pipe and a drinking-cup. The term is generally used to designate the metal casing or lining with which the recess is covered. The water-tank for supplying water-alcoves is usually placed on the other side of the partition, in the saloon, and commonly when so placed extends to the roof.

**Water-alcove front.** 1, fig. 1594-4½. See above.

**Water-alcove pan.** 2, figs. 1594-4½. See above.

**Water-base** (Bissell beater). Figs. 1350, 1385-6. Also called *water-bottom*. A tank similar to and serving the same purpose as the *safety-tank*, which see, of the Winslow heater.

**Water-closet.** Figs. 1087-89. "A commode with water supply to rinse the basin and carry off the contents."—*Knight*. The water-closet is in rare but increasing use.

in passenger cars. At present it is mainly confined to private cars. It is sometimes provided with an upholstered cover, and is then known as a *concealing water-closet*. See *Howard's parlor-car water-closet*.

**Water-cooler.** 133, fig. 156 : 1, fig. 1600. A tank or vessel for carrying drinking water which is usually cooled with ice. The sides are generally made double, and the space between filled with some non-conducting substance. They frequently extend to the roof. See *Water-alcove*. *Water-tank*.

**Water-cooler furnishings.** Figs. 1591-1602.

**Water-cooler stand.** 3, fig. 1600.

**Water-drip.** A pan or receptacle to receive the waste water from a water-cooler. A *drip-pipe*, or *waste-pipe*, connects with it.

**Water-cooler valve or waste-cock.** Figs. 1597, 1601. See *Tank waste-cock*.

**Water-table.** 1. (Masonry.) A projecting beveled face of stone to shed water from the parts below. Hence, especially applied to the top course of a foundation, which nearly always has such a face, the masonry above being set back.

2. A *window-ledge*, which see.

**Water-tank.** 133, figs. 187-9, 1600, etc. A vessel or reservoir for holding water. Those used on cars for drinking water are usually made of sheet-iron, and often extend through the roof as in fig. 203. They are then usually drawn from by a *water-alcove*, fig. 1594, the tank being usually in the corner of the saloon concealed from the interior of the car. Simpler forms like 1600 are much used. The tanks for supplying wash-room basins, 1, fig. 1570, are usually placed immediately under them and drawn from by a *basin-pump*.

2. (Howard's parlor-car water-closet.) Figs. 1087-89.

**Waved mouldings.** 1 to 15, figs. 1050-64. Mouldings which by a special machine are made of a corrugated section longitudinally, the number of waves or corrugations varying from 3 to 6 per inch. The cost of the mouldings is increased by this waving from 1½ to 2½ cents per foot.

**Weather strips.** Figs. 1698-99. A rubber strip with a metallic or wooden binding to apply around the crevices of windows or doors, for excluding of dust and wind, and for preventing water from entering around the windows. Weather strips are divided generally into *single-*

*edge strips*, fig. 1698, and *cushion strips*, fig. 1699, both being usually provided, as now manufactured, with a metal *moulding*. The cushion strip is simply rubber, folded over so as not to show a selvage edge. The standard widths of weather strips are  $\frac{3}{8}$ ,  $\frac{1}{2}$ ,  $\frac{3}{4}$ , and 1 in. They are usually made in lengths of fifty feet, but some of the cushion strips in lengths of only 7 ft.

**Web** (of a key). The solid portion of the *bit* of a key, the recesses cut away being termed *wards*. See *Bit*.

**Webbing.** A strong fabric, from one to four inches wide, made of hemp or other material which is not liable to stretch, used in upholstering car-seats. The ends of the spring-seat in fig. 1207 are of webbing, the top being either vulcanized fibre or leatheroid.

**Wedge.** 1. A term in quite general use for a *journal-bearing key*, which see. Figs. 1985-2001. See also *Stop-wedge*.

2. (Cowell platform and coupler.) See *Adjusting-wedge*.

3. (Miller platform.) 19, fig. 640. The *uncoupling-lever wedge*, attached to the platform by a *wedge-chain*.

**Wedge-chain.** 20, fig. 640. See above.

**Weigh-bar** (English). See *Brake-shaft*.

**Well** (Moehring argand lamp). C, figs. 849-50. A receptacle for the drip from the wick.

**Westinghouse air-brake.** A system of continuous brakes invented and patented (the first patent in 1869) by Mr. George Westinghouse, Jr., which is operated by compressed air. The air is compressed by a steam air-pump on the engine, and is stored up in a tank called the *main reservoir* on the engine or tender. When the brakes are applied the compressed air is conveyed from the tank by pipes connected together between the cars by flexible *brake-hose* to *brake-cylinders* under each car, by means of which the pressure of the air is communicated to the brake-levers, and thence to the brake-shoes. This was the first form of brake invented by Mr. Westinghouse; a later and improved form is the *Westinghouse automatic air-brake*, commonly called simply *Westinghouse brake*, which is now in almost universal use. A few roads throughout the country still adhere to the original form of the Westinghouse non-automatic brake, but for several years no new roads have been equipped with them. At the present time the *Westinghouse brake*, unless other-



wise specified, is always understood to mean the *automatic air-brake*. See below.

**Westinghouse brake** (more fully, Westinghouse automatic air-brake). Figs. 293-57. The change made from the original form of the Westinghouse air-brake (see above) in order to make it automatic was to carry a full pressure of air at all times in the brake-pipes and cause the brakes to be applied by a reduction of this pressure instead of by the admission of pressure, so that the breaking apart of the train or a reduction of pressure by escape of air at any point on the brake-pipe would apply the brakes to the whole train at once. A further advantage was that the action of the brakes was made quicker by saving the appreciable interval of time required for the compressed air to flow from a single reservoir at one end of the train in sufficient quantities to fill all the brake-cylinders. An *auxiliary reservoir* is placed under each car, containing air at the same pressure as in the brake pipes and main reservoir. An ingenious valve called the *triple-valve* connects the brake-pipe, auxiliary reservoir and brake-cylinder together in such manner that any reduction of pressure in the brake-pipe opens a passage for the air from the auxiliary reservoir to the brake-cylinder, applying the brakes, and closes the connection between brake-pipe and reservoir. To release the brakes, the pressure in the brake-pipes is restored: when the triple-valve closes the connection between the auxiliary reservoir and brake-cylinder and opens one between the brake-cylinder and the outer air and between the auxiliary reservoir and the brake-pipe. In order that the train brakes may be applied from any car, each car is fitted with a valve called the *conductor's valve*, connected to the brake-pipe, so that the compressed air therein can be permitted to escape by opening the valve.

Additional parts to perfect the working of the brake-gear in practice but not required in theory for its complete application are the *pump-governor*, fig. 316, the *pressure-retaining valve*, fig. 317, the *auxiliary discharge valve*, fig. 351, the *equalizing-valve*, etc., which see.

**Westinghouse duplicate brake-hose coupling**. Fig. 335. A device to obviate the danger of bursting the hose by using a double-hose connection between the coupling and the brake-pipe. At the upper and lower ends of the double hose there is a ball-valve so fixed that pressure of

air on either side will close it. They are not in very wide use.

**Westinghouse freight-brake**. Figs. 336-57. A device not differing essentially from the Westinghouse passenger brake-gear except that the parts are made lighter and cheaper for use on freight cars. To this end the triple valve, reservoir and brake cylinder are commonly combined in one part, as in fig. 352. The engine, air-pump and main reservoir on the contrary are made somewhat larger. Special arrangements for operating extra long trains and on extra heavy gradients have been introduced, as shown in the engravings.

**Westinghouse train-signaling apparatus**. Figs. 687-91. A device for utilizing the supply of compressed air required for operating the Westinghouse brakes to transmit signals to the engine instead of using the ordinary bell-cord. See *Train signaling apparatus*.

**Wheel**. 1. A circular frame or solid piece of wood or metal which revolves on an axis.

See <i>Brake-wheel</i> .	<i>Ratchet-wheel</i> .
<i>Gear-wheel</i> .	<i>Spur-wheel</i> .
<i>Hand-wheel</i> .	<i>Winding-shaft ratchet-wheel</i> .
<i>Brake ratchet-wheel</i> .	

2. Figs. 2124-80. A circular frame or disk, as above defined, serving to support a moving vehicle, as *car-wheel* (which see), *hand-car wheel*, *street-car wheel*, etc. Car-wheels are generally either *cast* (*chilled*) or *steel-tired*. *Steeled* wheels and the *Steele & Kear* wheel do not come fully under either of these titles. See words in italics for further details. See also *Wheel-tread*.

The defects for which wheels may be rejected under the rules for the interchange of traffic are as follows:

*Worn flat*—Where the flat spot or spots exceed  $2\frac{1}{2}$  in. in length or diameter, care being taken to distinguish this defect from "slid flat."

*Worn flange*—Where the flange is less than 1 in. thick, or has flat vertical surfaces extending more than  $\frac{1}{8}$  in. from the tread of the wheel.

*Cracked plate*, meaning all cracks in the plate other than those extending from the wheel-fit toward the rim, caused by bursting, the length of crack to be given.

*Cracked brackets*—The number cracked to be stated.

*Shelled out*, meaning wheels which become rough from circular pieces shelling out of the tread, leaving a rounded flat spot, deepest at the edge, with a raised centre. No wheel to be condemned for this fault unless the spots are over  $2\frac{1}{2}$  in. in length, or their number so great as to interfere with safe running.

**Wheel and axle gauges** (M. C. B. standards). Figs. 2114-23.

At the 16th M. C. B. Convention, Philadelphia, 1882, it was

"Resolved, That the sense of this meeting is that all the gauges recommended by the Committee on Wheel Gauge should be in use in all repair and car building shops of every equipment."

**Wheel-bore testing gauge.** Fig. 2121. One of the M. C. B. standard gauges.

**Wheel-bar** (iron six-wheel truck). A, figs. 1971-3. A substitute in iron for a wooden *wheel-piece* to which the pedestals are attached.

**Wheel-boss** (English). 26, figs. 116, 118. American term, *hub*. The centre of the wheel, which is bored out to receive the axle.

**Wheel-box** (street cars). 13, figs. 1843-4. A covering for a wheel which projects through the floor. The sides are usually of wood and the top of sheet-iron, but they are sometimes made entirely of wood or metal.

**Wheel-box button.** 14, figs. 1843-4. A stick of wood attached by a bolt to the top of a wheel-box so that it can be turned, somewhat like a door-button, to hold the wheel-box in its place.

**Wheel centre, or skeleton.** 26, 27 and 28, figs. 116 and 119. The whole of a railroad wheel, except the tire, and the fastenings which connect the tire to the *rim*.

**Wheel-centre** (steel-tired wheels). Figs. 2167-80, etc. The portion of a wheel inside of the tire, and between it and the hub or boss. The wheel-centre is sometimes in one piece and sometimes made up of two parts, the *hub* or boss and the *central filling-piece*, which see. *Face-plates*, front and back, are then usually also used. The term is seldom applied to chilled or cast wheels.

**Wheel-centre flange** (Atwood's hemp-packed wheel). G, fig. 2167. A flange on the wheel-centre designed to protect the hemp packing on the inside.

**Wheel-cover** (English). 188, figs. 204-6. See *Splasher*.

**Wheel-cut glass.** The ordinary process of glass cutting, which leaves a perfectly polished and perfectly transparent surface.

**Wheel-flange.** 26, fig. 2002; figs. 2150, etc. The projecting edge or rim on the periphery of a car-wheel for keeping it on the rail.

**Wheel-piece.** 10, figs. 1942-7, 1955-69, 2025. A stick of timber in a wooden-frame truck, which forms the side of the frame and to which the pedestals are attached. It

is often stiffened by outside and inside *wheel-piece plates* or by a *wheel-piece truss-rod*, the latter serving also as a *wheel-piece tie-rod* to tie the two end-pieces firmly to the wheel-pieces. A wheel-piece tie-rod is in all cases used, but it is not always used in the form of a truss-rod. Iron wheel-pieces are sometimes called *wheel-bars*.

**Wheel-piece plate.** 11, 12, figs. 1968-9. See above.

**Wheel-piece tie-rod.** See above.

**Wheel piece truss-rod.** 13, figs. 1955-67. See above.

**Wheel-plate.** 1. (Cast iron wheels.) 22, fig. 2002. That part of a plate car wheel which connects the rim and the hub. It occupies the place and fulfills the same purpose as the spokes do in an open or spoke wheel. See *Car-wheel*. *Wheel*.

2. (Steel-tired wheels.) Figs. 2159-71. See *Face-plate*.

3. (English.) 188, figs. 204-6. See *Splasher*.

**Wheel-ribs** (cast-iron wheels.) Figs. 2125-37. More commonly, *brackets*. Projections cast usually on the inner side of plate car-wheels to strengthen them. They are placed in a radial position and are often curved so as to permit the wheel to contract when it cools.

**Wheel-seat or wheel-fit** (of an axle). C, fig. 2002; 1974-5. The part which is inserted in the hub of a wheel. It is made truly cylindrical and very slightly larger than the *axle-seat* of the wheel. The wheel is pressed on it by hydraulic pressure and very rarely becomes loose. When this occurs, or the axle was turned too small, *prick-punching* and even *shimming* the seat has been resorted to to make a tighter fit, but this is forbidden by the rules for the interchange of traffic, nor has the practice ever been common, except as a hasty and somewhat dishonest expedient.

**Wheel-timber.** A *wheel-piece*, which see.

**Wheel-tread.** 25, fig. 2002. The outer surface or part of a car-wheel which bears on the rails. The standard width of wheel-tread, as recommended at 16th Annual Convention in Philadelphia, 1882, is  $5\frac{1}{2}$  in., measured from outside of tread to inside of flange, i. e., including the entire thickness of the flange. See fig. 2151.

**White-metal band.** 0 to 5, figs. 1189-1204. More properly *seat-back moulding*, which see.

**White's "anti-friction" car-door hanger.** Fig. 797. See *Car-door hanger*.

**Whitworth gauges.** See *Cylindrical gauge*.

**Whitworth system of screw-threads.** A system of screw-



threads designed by Sir Joseph Whitworth, of England, and which is almost universally used in that country and throughout Europe. It differs from the Sellers system in that the sides of the threads stand at an angle of 55 degrees instead of 60 degrees, and the tops of the threads and the spaces between them at the root are rounded, as shown in fig. 1828, instead of being flat, as in the Sellers system. The number of threads per inch in the two systems is as follows:

No. of threads per in. ....	Diameter of screw..	No. of threads per in. ....	Diameter of screw..	No. of threads per in. ....	Diameter of screw..	No. of threads per in. ....	Diameter of screw..
5	$1\frac{1}{8}$	9	$1\frac{1}{8}$	12	$1\frac{1}{8}$	13	$1\frac{1}{8}$
4 $\frac{1}{2}$	$1\frac{1}{4}$	8	$1\frac{1}{4}$	11	$1\frac{1}{4}$	11	$1\frac{1}{4}$
4	$1\frac{3}{8}$	7	$1\frac{3}{8}$	10	$1\frac{3}{8}$	10	$1\frac{3}{8}$
3 $\frac{1}{2}$	$1\frac{1}{2}$	6	$1\frac{1}{2}$	9	$1\frac{1}{2}$	9	$1\frac{1}{2}$
3	$1\frac{3}{4}$	5	$1\frac{3}{4}$	8	$1\frac{3}{4}$	8	$1\frac{3}{4}$
2 $\frac{1}{2}$	2	4	2	7	2	7	2
2	$2\frac{1}{8}$	3	$2\frac{1}{8}$	6	$2\frac{1}{8}$	6	$2\frac{1}{8}$
1 $\frac{1}{2}$	$2\frac{3}{8}$	2	$2\frac{3}{8}$	5	$2\frac{3}{8}$	5	$2\frac{3}{8}$
1 $\frac{1}{4}$	$2\frac{1}{2}$	1	$2\frac{1}{2}$	4	$2\frac{1}{2}$	4	$2\frac{1}{2}$
1	$2\frac{7}{8}$	1	$2\frac{7}{8}$	3	$2\frac{7}{8}$	3	$2\frac{7}{8}$
$\frac{3}{4}$	3	$\frac{3}{4}$	3	2	3	2	3
$\frac{1}{2}$	4	$\frac{1}{2}$	4	1	4	1	4

The Whitworth pipe-thread differs from the above. See *Pipe-thread*.

The Whitworth system is still used to a limited extent in this country, but has practically passed out of use.

**Whole-frame truck.** A *continuous-frame truck*, which see. Figs. 1948-53.

**Wickes refrigerator car.** The refrigerator doors open out, and are flush with the outside sheathing, and the usual sliding doors are omitted. The two ice compartments are located in opposite corners, and each covers 9 ft. of the car side, and 2 ft. 8 in. of the car ends. They are composed of metal *freezing-tank* surrounded by a wooden *jacket*, and elevated on oak gratings, 3 ft. above the floor. Under the gratings a narrow air chamber, with many rows of galvanized wire, extends to the *drip-pan* on the floor. A sloping bottom of galvanized iron leads the drip water to the wires, and the air, which enters the top of the compartment and circulates around the tanks, passes through the network of wire before again entering the provision or refrigerating chamber of the car. The car is iced through the roof. Dimensions of car outside of sills are 34×8 $\frac{1}{2}$  ft. Height from bottom of sills to top of plate 8 ft. 9 in., or

18 in. more than the New York central standard box car. Door opening 5 ft.

**Wicket.** See *Fare-wicket* (street cars).

**Wick-sleeve** (of student lamp, which see). I, fig. 852-4.

**Wide gauge.** In general usage, the distance between the heads of the rails of a railroad when it is *slightly* greater than 4 ft 8 $\frac{1}{2}$  in. in distinction from *broad gauge*, which see, which means a material increase, as to 5 ft. or 6 ft. Wide gauge is often used on curves, but its expediency is disputed.

**Wilson's flexible car-window blind.** Figs. 1645-7. A form of blind, consisting of perforated *slats* strung up on *slat-wires*, which is so flexible that it can be pushed up into a *window-blind pocket* on the inside of the lower deck of the car, thus enabling higher windows to be used. The slats are counter-bored and kept separate at the proper distance by a *thimble* strung upon the wire. Another device to accomplish the same end is the *Paul blind*, which see.

**Wind-guard, or protection-cap** (Harrison postal-car chandelier). B, figs. 841-2. A covering over the smoke-bell pipe.

**Winding-arbor.** 4, figs. 109-12. See *Square-end*.

**Winding-gear** (pile-driver car). 41, 42, figs. 1831-1834. Consists of *spools* and a spur-gear of the ordinary form controlled by a *strap-brake* and treadle, so that on the release of the brake the shears attached to the hammer-rope will descend by their own weight and engage with the *hammer-eye*.

**Winding-shaft** (drop-doors of coal cars, etc.). 129, figs. 105-7; 4, figs. 109-12. A round iron bar supported by the *winding-shaft plates*, to which the *drop-door chain* or *hopper-chain* is attached. It carries a *ratchet-wheel*.

**Winding-shaft plate** (of a hopper-bottom coal car). 133, figs. 105-7; 1, figs. 109-112. The plate attached to the side of the car carrying the *ratchet-wheel*, *pawl*, and *dog*, serving as a bearing for the winding-shaft. See above.

**Winding-shaft ratchet-wheel.** 3, figs. 109-12; 130, figs. 105, 107.

**Windlass.** 1. " (Nautical.) A large horizontal roller journaled in standards (*cheeks*, *windlass-bitts*), and rotated by *hand-spikes* or other means. It differs from the *capstan* principally in the horizontality of its axis. Smaller hoisting-machines, turned by cranks, are *winches*

and some are specially adapted to machines which revolve on their bases, as cranes, derricks, etc."—*Knight*. See *Derrick*.

2. A *brake-shaft* is sometimes called a *brake-windlass*, which, however, is little authorized by the meaning of the word.

**Window.** Figs. 692-5, 194; 137, figs. 155-85, etc. "An opening in the wall of a building or car for the admission of light and of air when necessary. This opening has a frame on the sides, in which are set movable *sashes* containing panes of glass."—*Webster*. Hence the window itself, especially in compound words, is often termed simply the *sash*. In England, carriage windows are technically termed *lights*. See also *Deck-sash*. Car windows are now generally made of uniform size throughout, but *twin windows*, *small windows*, etc., are used, as in figs. 54, 164-8. In sleeping and parlor cars *double windows* are almost always used to inclose an air-space between them and prevent radiation of heat and drafts.

**Window-balance** (or *sash-balance*, which see). Figs. 1703-7. A device in which a spring is used instead of a weight to counterbalance the weight of the sash and glass.

**Window-blind.** 140, figs. 155-85; 17, 18, figs. 692-3, etc. A wooden screen composed of a frame called the *sash*, carrying *slats*, placed in a window to exclude sunshine. Window-blinds, especially in street cars are sometimes made *single*, but for lack of room to raise so large a sash, they are usually made *double* and distinguished as *upper* and *lower*. *Flexible window blinds*, which see (figs. 1645-7), of recent introduction, known as the Wilson and Paul flexible window-blinds, are designed to obviate the difficulty of using a large window with a single sash or even with double sashes, by constructing the blind so that it can slide up into a curved pocket under the roof of the car. In sleeping and parlor cars *shades* are used instead of blinds, and the same usage is extending to ordinary "first-class" passenger cars.

**Window-blind bolt.** Fig. 1607, 1630. A bolt used for holding a window-blind in any desired position. It enters into a *window-blind-bolt bushing* or *plate*.

**Window-blind-bolt bushing.** Figs. 1654, 1681. See above. Same as *sash-lock bushing*.

**Window-blind-bolt plate.** Figs. 1655-7. See above. Same as *sash-lock plate*.

**Window-blind lift.** Figs. 1673-82, etc. Commonly called simply *blind-lift*. A metal hook fastened to the blind for raising and lowering it, usually attached to the bottom-rail, but in street-car-blinds, which are lowered below the window, to the top-rail. Window-blind lifts are distinguished as *single* and *double*, the single lift being the upper, and the double lift the lower, which has a projection for raising the outer part. Double window-blind lifts are also distinguished as *lower* and *upper*. The upper lift differs from the lower by *not* having a lug or ledge, which is carried on the lower blind for the purpose of engaging with the upper when the lower one is half raised, so that the two may thereafter be raised together.

**Window blind mullion.** 15, figs. 692-3; 72, fig. 1843. An upright bar in the centre of a window-blind sash.

**Window-blind pocket** (Wilson's flexible car-window blind). G, fig. 1646. A curved cavity under the lower deck of a passenger-car roof for the reception of the blind when thrown up away from the window.

**Window-blind pull.** A *window-blind lift*, which see.

**Window-blind rail.** 14, figs. 632-3; 71, fig. 1843. A horizontal bar of a window-blind sash.

**Window-blind rest.** 1. A wooden strip to fill up the lower part of the groove in which an upper window-blind slides, and on which it rests when down.

2. (Street cars.) 49, fig. 1844. A horizontal strip of wood which extends from one body-post to another, on which the blind rests when it is lowered.

**Window-blind sash.** 86, figs. 155-85; 13, 14, figs. 692-3, etc. The frame in which the inclined thin *slats* are held.

**Window-blind slat.** 17, 18 figs. 692-3. See above.

**Window-blind spring.** Figs. 1648-51. The same as a *Sash spring*, which see.

**Window-blind stile.** 13, figs. 692-3. An upright bar in a window-blind sash.

**Window-blind stop.** 19, fig. 692, etc. An *Inside window-stop*, which see.

**Window button.** Figs. 1652-5. A small piece of metal swiveled by a screw which supports a window when open. There are two leading forms, L or *monkey-tail* and



- Window buttons.** Neither of them are used in the finest cars.
- Window-casing.** 7, figs. 692-5; fig. 1683; 86', figs. 169-77. A frame which incloses or surrounds a window. Often called an *Inside window stop*.
- Window-catch (automatic).** Figs. 1663-4. A species of *monkey-tail window-button*, so formed as to fall into place by gravity.
- Window-cornice.** 34, fig. 695. A purely ornamental projecting structure, usually made of wood, placed over a window on the inside. It is now little used.
- Window cove-moulding.** 87, fig. 175. A small concave moulding around the sides and top of a window on the inside of a passenger car.
- Window-curtain.** 27, figs. 680-1, 693-5. A cloth or some kind of textile material loosely hung over a window to exclude sunshine, and which can be spread or drawn aside at pleasure. Curtains of this kind are now little used. *Window-shades*, which see, lie always flat, and are rolled up upon *shade-rollers*. They are often also called curtains.
- Window-curtain bracket.** Figs. 1691-2. More commonly, simply *curtain-bracket*, for supporting window-shade rollers. A more correct term would be *shade* or *window-shade brackets*, but in common usage *curtain* brackets support *shade* rollers.
- Window-curtain-cord tightener.** Fig. 1696. Practically obsolete. See *Shade* and *curtain*.
- Window-curtain holder or hook.** 29, figs. 693-5; figs. 1694-5. A metal hook fastened at the side of a window for holding a curtain when drawn aside. *Knobs* are also used.
- Window-curtain knob.** Fig. 1695. A form of *window-curtain hook*.
- Window-curtain leather.** 28, figs. 677-81, etc. More properly, *window-shade leather*.
- Window-curtain pulley.** Fig. 1688. Practically obsolete. See *Shade* and *curtain*.
- Window-curtain rings.** 32, figs. 693-4, 1696½. See *Curtain*.
- Window-curtain rod.** 30, figs. 693-4, 1693. See *Curtain*.
- Window-curtain-rod stanchion.** 31, figs. 693-4: 1, fig. 1696. A support for a *curtain-rod*. See *Curtain*.
- Window-curtain roller.** Figs. 1683-92. More properly, a *shade*, or *window-shade roller*, which see.
- Window deflector-ventilator.** See *Deflector* and *ventilator*.
- Window-fastener.** Figs. 1659-61. A *sash-lock*, which see.
- Window-furnishings (for deck-sashes).** Figs. 1603-45. (For lower windows.) Figs. 1646-1707.
- Window-glass.** 6, figs. 692-5, etc., etc. Panes of glass used for windows. They are either *plate* or *rolled* glass, made by pouring the molten glass on to a table having the height of the desired thickness of the plate, and then passing a roller over the top, or *blown*, or common *window-glass*, the latter being by far the cheapest and most widely used, but of very much inferior quality. It is made by blowing the glass into a large bulb, which is then slit open while still hot and flattened out.
- Window-grating.** A wrought or cast-iron partition made of bars, or in other form, placed on the outside of the windows of passenger cars to prevent passengers from putting their heads or arms outside. Now rarely used.
- Window-guards (street cars).** 77, fig. 1845. Small metal rods to act as *feuders* for the end windows.
- Window-holder.** A *window-button* or *sash-holder*, which see.
- Window-latch.** Fig. 1659-61. A *sash-lock*, which see.
- Window-latch stop (lower and upper).** 24, fig. 692. See *Sash lock stop*.
- Window-latch plate.** Figs. 1655-7. A form of *sash-lock stop*.
- Window-ledge (street cars).** 45, figs. 1843-6. A projecting moulding outside of a car which extends from one end of it to the other above the windows, intended to shed the rain.
- Window-lift.** Figs. 1665-72. See *Sash-lift*.
- Window-lintel.** 90, figs. 155-85. A horizontal strip on the outside of a passenger car between the posts and over the window-openings.
- Window-moulding (passenger car interiors).** Figs. 1050-64; 88, fig. 175; 8, figs. 692-5. Known to the trade as *car mouldings*, and used around or on each side of a window, especially to cover the joint between the panel and post. It sometimes forms a groove on the post in which a window or window-blind slides, in place of the *inside window-stop*, which see.

**Wirdow-moulding base.** 10, figs. 692-3, etc. An ornament made of wood or metal attached to the lower end of a window-moulding.

**Window-moulding joint-cover.** 9, figs. 692-3, etc.; fig. 1697. A piece of metal or wood used to cover the joints of window-mouldings when two pieces join each other.

**Window-panel.** 24, figs. 676-8, etc. See *Panel*. A panel between the windows known as *inside*, *outside* and *end*.

**Window-panel furring.** 59, figs. 155-85. Horizontal distance-pieces between the window-posts to which the paneling is fastened.

**Window-post** (passenger cars). 58, figs. 155-85. A post extending from sill to plate at the side of a window-opening against which the sash and blind slide.

**Window-rail.** 12, figs. 692-5, etc. A horizontal bar in a window-sash.

**Window-rod bushing.** Fig. 1067. A support for the ends of a *curtain-rod*, which see.

**Window-sash.** 85, figs. 155-85; 11-12, figs. 692-5; 65, 66, figs. 1843-6. See *Sash*.

**Window-sash holder.** See *Sash-lock*. Figs. 1659-61, etc.

**Window-sash lift.** A *sash-lift*, which see. Figs. 1665-72.

**Window-sash rest** (street cars). 50, figs. 1844. A strip of wood extending from one body-post to another, on which the sash rests when lowered.

**Window-sash spring.** Figs. 1649-50, etc. See *Sash-spring*.

**Window-shade.** A window-curtain, which is rolled on a roller above the window, in distinction from one which is drawn aside. In car-building it is nearly always finished at the bottom with a *window-shade leather* and heavy *window-shade rod*, both of which are almost invariably like fig. 1683. A rectangular slot, which is somewhat inaccurately called an *eyelet*, is inserted in the leather to fasten the shade down by slipping it over the sash-lift. In passenger cars window-blinds are generally used and not shades, but nearly all sleeping and parlor cars and many of the newer passenger cars have window-shades in place of blinds. Some form of automatic *shade-roller*, which see, is nearly always used, the old fashioned pulleys and cord tighteners, figs. 1688-96, being practically obsolete.

**Window-shade leather.** 28, figs. 680-1. See above.

**Window-shade tassel.** 33, figs. 694-5. An unusual style of finishing the bottoms of window-shades.

**Window-sill.** 77-78, figs. 175-6, 180; 5, figs. 692-4. A horizontal piece of wood or sometimes cast-iron under a window, on which the sashes rest when down. There are usually two, *inside* and *outside*. A thin strip called the *window-sill cap* goes above it.

**Window-sill cap.** 79, figs. 175-6. See above.

**Window-sill moulding.** 80, figs. 175-6. A small wooden molding under an inside window-sill. In modern cars it is usually a *belt-moulding*, as 80, figs. 179-80.

**Window-spring.** Figs. 1648-51. See *Sash-spring*. *Spring-sash-holder*.

**Window-stile.** 11, figs. 692-5; 66, figs. 1843-4. The upright hars of a window-sash.

**Window-stop.** 84, 86', figs. 175, 180; 51, figs. 843-4. The strips, or *beads*, attached to the window-posts which hold the sashes in place. There are always two, *inside* and *outside*, and *parting-beads* or *sash-parting strips* in between.

**Window-stop** (inside). 7, fig. 694-5. See *Window-casing*.

**Window ventilator.** See *Deflector*. *Ventilator*.

**Wind scoop.** Figs. 1526-33, 1092-4, etc. A hood or ventilating-jack (often so called), attached to a pipe passing through the roof of a car, and so formed as to create either an exhaust draft or the contrary by the current of external air passing over the car. In the Gouge heater similar parts of somewhat more elaborate construction are called the *injector* and *exhausting weather cap*.

**Wings** (pile-driver car). 20, figs. 1821-4. See *Pile-driver car* and *swinging-platform*.

**Winslow car-roof.** Figs. 670-5. A car-roof, patented by A. P. Winslow, which consists of metal *roof-sheets* laid cross-wise to the car. They are made with corrugations and are let into grooves in the rafters. The latter are covered with strips of sheet-iron and the whole with a layer of transverse boards, which are fastened to longitudinal purlins attached to the rafters or carlines. See *Car-roof*.

**Winslow car stove.** Figs. 1533-7. A stove invented by A. P. Winslow, the peculiarity of which is that the base consists of a *safety-tank* which is connected by *safety-flues* to the fire-pot, so as to extinguish the fire in case of overturning. A wind-scoop and cold-air pipe are



attached to the stove in some cases, as fig. 1533, making a simple form of *heater*.

**Wire.** See *Seal-wires*, figs. 1114-6. *Woven-wire*, figs. 1136-8, 1208-10.

**Wire-base** (for lantern). Fig. 985.

**Wire-cord** (Anderson sash-balance). 2, fig. 1707.

**Wire-covered bell-cord.** See *Bell-cord*. Little used.

**Wire-gauze** (for ventilator). A fine netting made of wire with which the outside of ventilator openings is covered to prevent the admission of dust.

**Wire shade-tripod.** Fig. 937. See *Shade-ring*.

**Wolfrath's combined sash-lift and lock.** Figs. 1700-1702. A device to enable car windows to be lifted with one hand without using another to release the sash-lock. A *lifting-plate M* is added to the under side of an ordinary sash-lift, which acts upon an interior *bell-crank F*, in such a manner as to withdraw the *ratchet-bolt C* from a ratchet fixed to the window casing, it being released again so as to engage with the *rack A* on withdrawing the pressure from the lifting-plate.

**Wood-centre car wheel.** Figs. 2151 and 2158. A form of car-wheel used in England almost universally for passenger service, but rarely in this country, in which the wheel-centre is entirely made up of teak wood used as a continuous and solid series of spokes held in place by side-plates and Mansell retaining rings. Called in England the *Mansell wheel*. The *Thomas wheel*, figs. 2174-76, uses wooden blocks inside the tire, but is not a wood-centre wheel. See *Steel-tired wheel*. *Car-wheel*. *Tire-fastening*.

**Wooden brake-block** (English). 63, figs. 116-117. A piece of soft wood used in England as a brake-block, which see. Wood is gradually being superseded by cast iron.

**Wooden wheel** (for hand-cars). Fig. 2143. A form of *wood-centre wheel*, which see.

**Wooden-frame truck.** A car-truck, of which the wheel-pieces and end-pieces are made of wood. Figs. 1912-69 are illustrations. See *Truck*. *Car-truck*.

**Wooden floor-mat** (street cars). A sort of grating made of strips of wood, with distance-pieces and spaces between.

**Wood-screw.** A small cylindrical bar of iron or steel with a wood screw-thread cut on it and a slotted head so that it can be turned with a *screw-driver*. A *lag-screw* is a

heavy kind of wood-screw, but is not so called. It has a square instead of slotted head, as fig. 1868. See *Screw*.

**Wood screw-thread.** A form of screw-thread used for screws which are intended to screw into wooden objects. It differs from a *metal* thread in having the spaces between the projections wider. This kind of thread is shown in fig. 1863.

**Wool packed spiral-spring.** Figs. 2046-7. A practically obsolete spring once largely used in freight service.

**Worm.** A helix like a screw-thread, for winding rope or chain upon. See *Brake-chain worm*.

**Worn flat** (car-wheels). Under the rules for the interchange of traffic this defect is defined to be irregular wear under fair usage, due to unequal hardness of the tread of the wheel, and to be carefully distinguished from *slid flat*, which is a defect produced by the slipping of the wheels from excessive brake-pressure. The rules provide that flats exceeding  $2\frac{1}{2}$  in. in length or diameter are cause for rejection.

**Wrecking car.** Figs. 75-80, 144-53. Also called *tool-car* or *derriek-car*. Figs. 75 and 76 represent the most powerful type, being worked entirely by steam, and having sufficient capacity to lift a locomotive. Detail specifications will be found in the "Railroad Gazette" for August 1, 1884. Figs. 79-80 are the stronger and most approved form of hand-wrecking car. Figs. 77-78 is another and lighter form in very general use.

**Wrench.** A contrivance for screwing and unscrewing a nut. A *monkey-wrench* is adjustable to take nuts of various sizes. A *socket-wrench*, figs. 1597-9, is one having a cubical cavity to receive a *square-end*. The wrenches for the Westinghouse brake are *packing-nut* and *cap screw wrenches*, 49-50, fig. 311, and the *discharge-valve seat wrench*, 32, fig. 311. A *spanner*, which see, is a wrench for use on round or many-sided nuts, like hose-couplings, to which lugs or slots are added for engaging with the wrench.

**Wrought-iron wheel.** Figs. 2179-80, etc. A steel-tired wheel, with a wrought-iron centre, either with spokes or with solid plates.

2. (English.) Figs. 2179-80. A "wagon-wheel." A wheel in which the rim and spokes are of wrought iron and the hub (*boss*) is either of wrought or cast iron. If the former the spokes are welded to it, if the latter it is cast round the spokes. The tire is shrunk on. This

wheel is largely used in freight (goods) service in England, and in both freight and passenger service on the continent of Europe. It very rarely fails. See also *Kirtley double-spoke wheel. Wheel. Car-wheel.*

**Wrought moulding, or fasciamoulding** (English). 122, figs. 205, 207. A moulding which is worked out of the solid on a horizontal or vertical part of the framing of a carriage body. See *Planted moulding.*

## X

**"X" car-roof.** Fig. 650. A form of roof for some reason little used, except in smoking and other cheap cars, in which the carlines are, in form at least, independent rafters crossing each other under the upper deck in the form of an X. An "A" car-roof, which see, is a different type of the same general idea; also unusual.

## Y

**Yale lock.** Figs. 1027-8. A form of lock so named from its inventor, which uses a flat key with an irregularly curved edge sliding into a *cylinder* which carries a number of pins, each cut into two parts, as tumblers. The edge of the key raises these tumblers to precisely the right height to bring the joint in them to the edge of the cylinder and permit revolution. The advantages of the lock are its conciseness and simplicity and the difficulty of taking an impression for making a false key. To still further increase this difficulty, a *corrugated key* has recently been introduced, and is shown in the engraving.

**Yoke.** 1. ("American" steam tender-brake.) 8, figs. 366-

7. A malleable iron guide for the cylinder brake-lever, fastened to the rear end of the cylinder by the *yoke-stud* and *nuts*.

2. (Car door lock.) F, fig. 1005. A part inclosing the double-armed dog of the spindle in such manner that the motion of the door-knob in either direction moves back the latch.

3. (Car trucks.) 103, fig. 1959, etc. A *spring-saddle*, which see.

4. (Raoul journal-box, which see.) Fig. 2014. A strap embracing the journal-box lid to take up the end thrust. The use of the yoke has recently been abandoned in favor of a sliding cap or lid moving vertically in grooves to open the box for oiling, but falling of its own gravity when oscillation or jarring begins, if by accident left up.

**Yoke-lever** (Janney coupler). 9, figs. 542-554. The part connecting the *coupler* and the *buffers* of the draw-gear, by means of which the co-operation of coupler and buffers is secured.

## Z

**Zenith lamp-burner.** Fig. 900. One of the no-chimney burners. See *Lamp-burner.*

**Zimmerman refrigerator car.** The old style has its ice-box at the top of the car extending its full length and no circulation of air. The *Zimmerman improved* car is fitted with ice-boxes in the ends of the car through which run a number of flues which are intended to start a circulation of air and increase the cooling surface of the car.



# INDEX TO ENGRAVINGS.

*Note.*—The following engravings, 2,183 in all, are all alphabetically arranged under the following general heads; the six general headings in CAPITALS being by far the most important and including under them the great bulk of the engravings, which are again sub-classified alphabetically:

	PAGE.	CUT No.		PAGE.	CUT No.
<b>CARS, GENERAL VIEWS OF,</b>			<b>Screw-threads.....</b> ( 2 pages, 10 cuts)	294	1,825
( 18 pages, 81 cuts)	2	1	<b>Street Cars.....</b> ( 4 " 30 " )	296	1,835
<b>CAR-BODIES.....</b> ( 76 " 133 " )	20	82	<b>Sundries .....</b> ( 1 " 33 " )	300	1,865
<b>CAR-BODY DETAILS..</b> ( 92 " 481 " )	96	215	<b>Trucks, Baggage and Freight,</b>		
<b>FURNISHINGS.....</b> ( 96 " 1,012 " )	188	696	( 1 " 9 " )	301	1,898
<b>Hand Cars.....</b> ( 5 " 19 " )	284	1,708	<b>TRUCKS, for Cars .....</b> ( 23 " 67 " )	302	1,907
<b>Logging Cars.....</b> ( 3 " 94 " )	289	1,727	<b>TRUCK DETAILS.....</b> ( 33 " 207 " )	325	1,974
<b>Pile-driver Car.....</b> ( 2 " 4 " )	292	1,821	<b>Trusses.....</b> ( 1 " 8 " )	358	2,181
<b>Total.....</b>				357	2,188

If this general arrangement be borne in mind, there will be no difficulty in turning at once to any given engraving or class of engravings desired, all being alphabetically arranged under their title and sub-title, as shown in part above and more fully in the following detailed index. Under each of the headings and sub-headings of the following list, the engravings are in general arranged alphabetically, according to the names of roads or otherwise, so far as their nature would permit:

	PAGE.	CUT No.		PAGE.	CUT No.
CARS, Freight,	<i>General Views</i>	2	1	CAR-BODY DETAILS, Bolsters . . . . .	96 215
" " <i>Cabooses, etc.,</i>	"	8	43	Brake Gear . . . . .	98 227
" Passenger,	"	9	48	" " <i>Creamer</i> . . . . .	105 263
" Postal and Baggage,	"	13	57	" " <i>Air, Eames</i> . . . . .	106 266
" Working,	"	16	70	" " <i>Smith</i> . . . . .	110 289
CAR-BODIES, Freight, <i>Box Cars</i> . . . . .	20	82	" " <i>Westinghouse</i> . . . . .	112 293	
" " <i>Caboose Cars</i> . . . . .	30	102	" " " <i>Freight</i> . . . . .	127 336	
" " <i>Coal Cars</i> . . . . .	32	105	" " <i>Steam, American</i> . . . . .	134 358	
" " <i>English "Wagon"</i> . . . . .	36	116	Doors . . . . .	138 370	
" " <i>Fruit Cars</i> . . . . .	38	121	" " <i>Grain-doors</i> . . . . .	139 373	
" " <i>Refrigerator Cars</i> . . . . .	40	126	Draw-gear, Freight . . . . .	141 383	
" " <i>Stock Cars</i> . . . . .	44	132	" " (standards) . . . . .	145 401	
" " <i>Tank Cars</i> . . . . .	50	139	" " <i>Aut. couplers</i> . . . . .	147 409	
" " <i>Tip Cars</i> . . . . .	52	143	" " <i>Continuous</i> . . . . .	150 424	
" " <i>Wrecking Cars</i> . . . . .	53	144	" " <i>Coupling links,</i>		
" Passenger, <i>Day Coaches</i> . . . . .	57	154	<i>etc.</i> . . . . .	151 428	
" " <i>Dining Cars</i> . . . . .	85	191	" " <i>Drawbars</i> . . . . .	152 440	
" " <i>Emigrant Sleep-</i>			" Passenger, <i>Cowell</i> . . . . .	157 537	
<i>ing Cars</i> . . . . .	86	195	" " <i>Janney</i> . . . . .	158 542	
" " <i>English First-</i>			" " <i>Janney-Miller</i> . . . . .	160 554	
<i>Class Carriage.</i>	92	204	" " <i>Miller</i> . . . . .	163 636	
" " <i>Sleeping Cars, etc.</i>	94	208	Framing . . . . .	165 644	

CAR-BODY DETAILS, <i>Continued.</i>		PAGE.	CUT No.	FURNISHINGS, <i>Continued.</i>		PAGE.	CUT No.
Grab-irons and Ladders .....	167	656		Stoves and Heaters, <i>Johnson</i> .....	258	1,472	
Lettering .....	168	658		" <i>Miscellaneous</i> .....	259	1,473	
Roofs .....	169	664		" <i>Ranges and Cook-</i>			
Sleeping Berths .....	172	676		<i>stoves</i> .....	260	1,480	
" <i>Emigrant</i> .....	176	682		" <i>Searle</i> .....	261	1,484	
Steps .....	178	686		" <i>Spear</i> .....	262	1,486	
Train Signaling Apparatus .....	179	687		" <i>Suspended Heater</i> .....	266	1,529	
Windows .....	181	692		" <i>Winslow</i> .....	268	1,533	
FURNISHINGS, Basket Racks .....	183	696		Table .....	270	1,538	
Bell-cord, <i>Bushings and Couplings</i> ..	184	702		Ventilators .....	271	1,553	
" <i>End-hooks and Guides</i> ..	185	715		Wash-room .....	273	1,570	
" <i>Hangers and Splices</i> ..	186	732		Water-coolers, <i>etc</i> .....	275	1,591	
Door, <i>Bolts, Springs, etc</i> .....	187	746		Window, <i>for Deck Sashes</i> .....	276	1,603	
" <i>Door-stops</i> ..	188	762		" <i>for Lower Windows</i> ..	280	1,646	
" <i>Hinges</i> ..	189	779		HAND CARS, <i>General Views</i> .....	284	1,708	
" <i>Sliding-door fixtures</i> ..	190	791		" <i>Details</i> .....	286	1,720	
Floor .....	191	802		LOGGING CARS, <i>General Views</i> .....	289	1,727	
Gas Fixtures .....	192	812		" <i>Details</i> .....	290	1,731	
Lamps, <i>Centre Lamps</i> ..	195	828		PILE-DRIVER CAR .....	292	1,821	
" <i>Side Lamps</i> ..	202	851		SCREW THREADS .....	294	1,825	
Lamp Burners .....	205	872		STREET CARS, <i>General Views</i> .....	296	1,835	
" <i>no-chimney</i> .....	208	896		" <i>Details</i> .....	297	1,843	
" <i>Oil Lamps, etc</i> ..	209	907		SUNDRIES .....	300	1,865	
Lamp Chimneys and Shades .....	210	926		TRUCKS, <i>Baggage and Freight</i> .....	301	1,898	
Lanterns .....	212	959		" <i>Freight-car, Diamond Type</i> ..	302	1,907	
Locks .....	215	987		" <i>Miscellaneous Types</i> ..	311	1,941	
" <i>Freight-car Locks</i> ..	217	999		" <i>Passenger-car, Four-wheel</i> .....	316	1,954	
" <i>Padlocks</i> ..	219	1,029		" <i>Six wheel</i> ..	323	1,969	
Miscellaneous ..	220	1,038		TRUCK DETAILS, <i>Axles</i> .....	325	1,974	
Mouldings .....	221	1,050		" <i>Brake-Shoes, etc</i> ..	326	1,977	
Postal-car ..	222	1,065		" <i>Journal Bearings</i> .....	327	1,982	
Saloon .....	224	1,087		" <i>Journal Boxes</i> .....	329	1,997	
Seals .....	227	1,108		" <i>Pedestals</i> .....	333	2,021	
Seats .....	228	1,120		" <i>Side Frames, Side bear-</i>			
" <i>Parlor-car Chairs</i> ..	234	1,154		<i>ings, etc</i> .....	334	2,025	
" <i>Seat-arms, etc</i> ..	236	1,167		" <i>Springs, Elliptic</i> ..	335	2,031	
" <i>Seat Ends and Mouldings</i> .....	238	1,192		" <i>" Rubber, etc</i> ..	337	2,042	
" <i>Upholstery details</i> .....	239	1,205		" <i>" Spiral</i> .....	338	2,049	
Sleeping-car <i>Berth Fixtures, etc</i> .....	242	1,231		" <i>" Spiral Gradu-</i>			
" <i>" Safety Latches</i> ..	244	1,261		<i>ated</i> .....	345	2,095	
" <i>" Curtain Fixtures</i> ..	245	1,265		" <i>Swing Links, etc</i> .....	347	2,107	
" <i>Head-board Details</i> .....	246	1,275		" <i>Wheel and Axle</i>			
" <i>Emigrant</i> .....	247	1,285		<i>Gauges</i> .....	348	2,114	
Stoves and Heaters, <i>Baker</i> .....	248	1,300		" <i>Wheels, Cast</i> .....	349	2,124	
" <i>Bissell</i> ..	251	1,349		" <i>" Steel-tired</i> ..	354	2,152	
" <i>Gouge</i> .....	254	1,405		TRUSSES, <i>Typical forms of</i> .....	358	2,181	



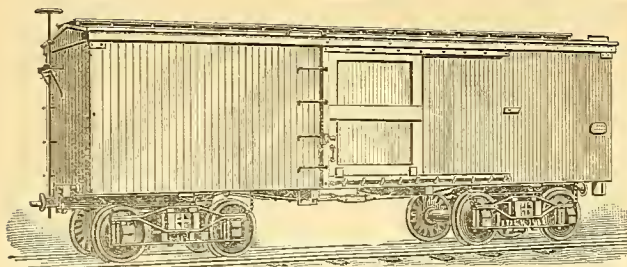


Fig. 1. BOX CAR, Eight-wheeled.

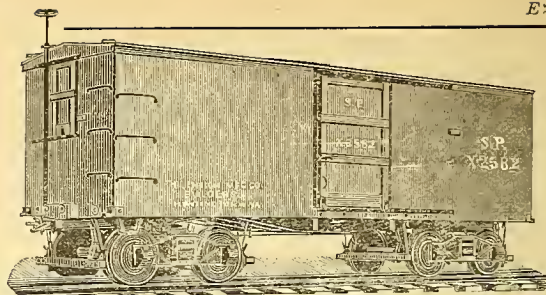


Fig. 2. BOX CAR, with END DOOR.

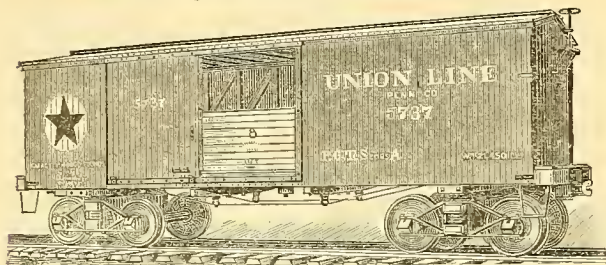


Fig. 3. BOX CAR, showing GRAIN DOOR.

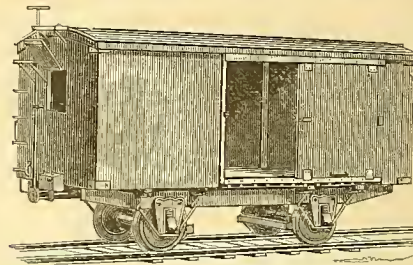


Fig. 4. BOX CAR, Four-wheeled.  
(Little used; the same type is built with inside sheathing only, leaving framing exposed.)

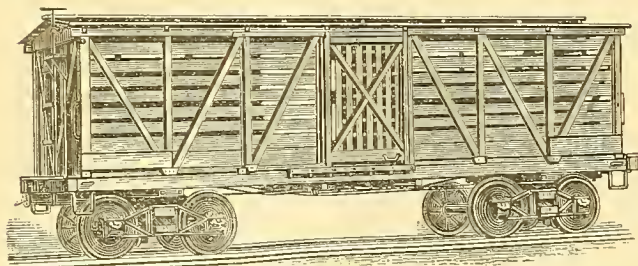


Fig. 5. STOCK CAR.  
("BASTARD HOWE" Framing), old style, but much in use.

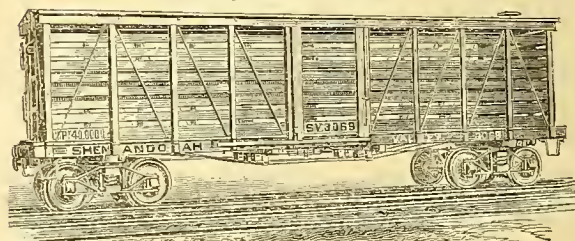


Fig. 6. STOCK CAR.  
Standard of Pennsylvania Railroad and allied lines ("PRATT-TRUSS" Framing).

Double-Deck Stock-Cars, shown in Figs. 132-138.

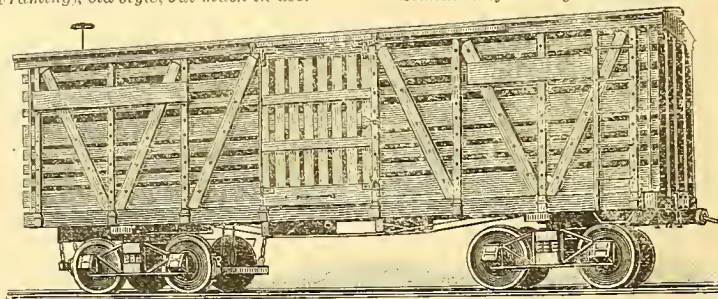


Fig. 7. STOCK CAR. ("BASTARD HOWE" Framing.)

See also Figs. 27-42, giving dimensions of these types.

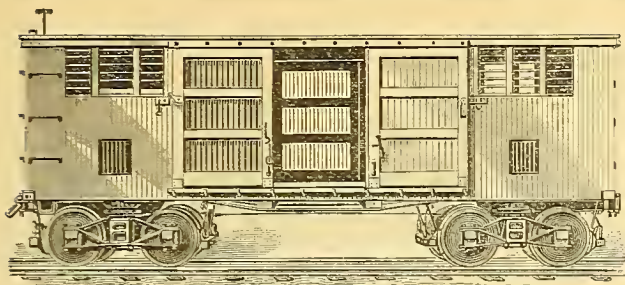


Fig. 8.  
BOX STOCK CAR OR HORSE CAR (little used).

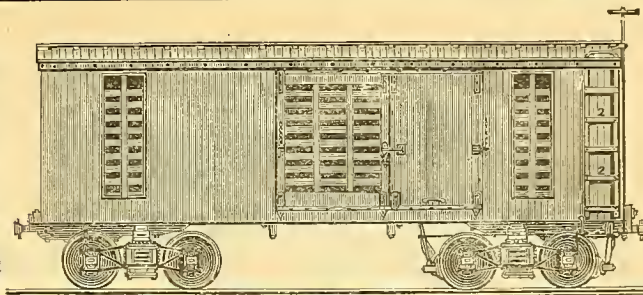


Fig. 9.  
BOX STOCK CAR (little used).  
1. Ladder Sides. 2. Ladder Rounds.

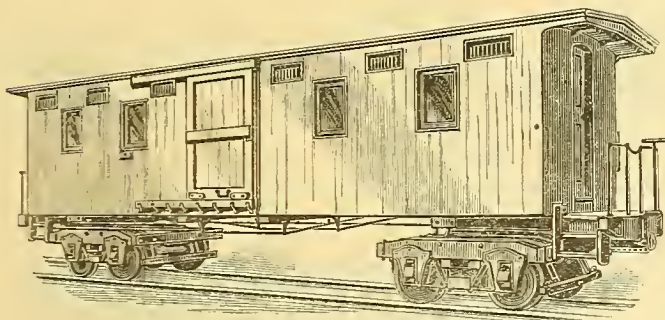


Fig. 10.  
MILK CAR.

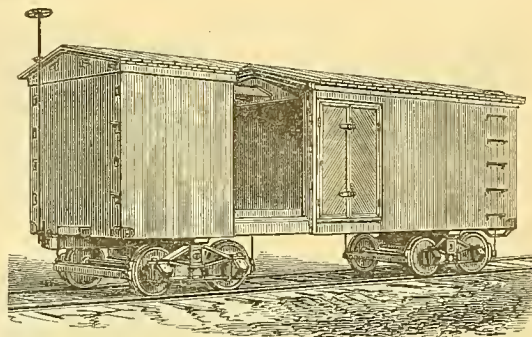


Fig. 11  
REFRIGERATOR CAR.  
(Old style; engraving imperfect as respects ice-box below the roof.)



Fig. 12.  
REFRIGERATOR CAR (modern).  
(One of many types. See Dictionary, REFRIGERATOR CAR.)



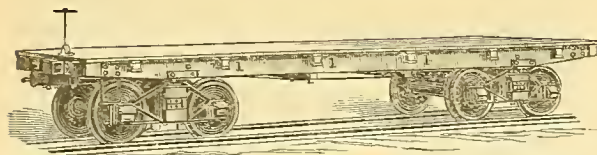


Fig. 13.  
FLAT CAR.  
1. Stake-pocket.

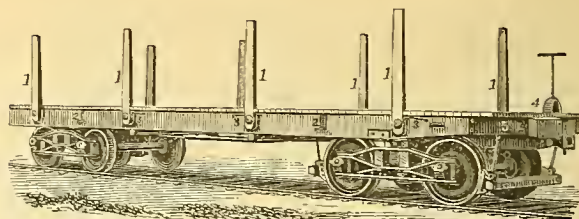


Fig. 14.  
FLAT CAR, with STAKES.  
1. Stake. 2. Stake-rest. 3. Stake-hook.

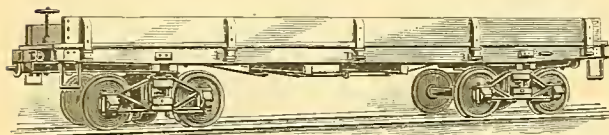


Fig. 15.  
GONDOLA CAR.  
1. Stake-pocket.

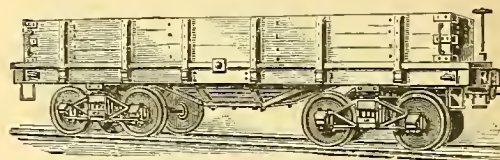


Fig. 16.  
HOPPER-BOTTOM GONDOLA CAR.

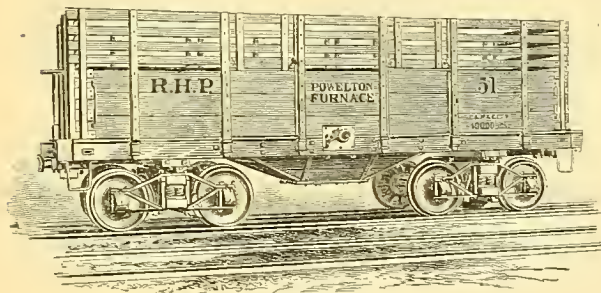


Fig. 17.  
COKE CAR.

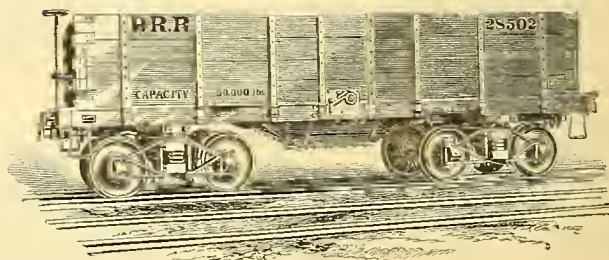


Fig. 18.  
HOPPER-BOTTOM GONDOLA CAR.  
(Modern type, 25 tons capacity.)

See also Figs. 29-42,  
giving dimensions of these types.



Fig. 19.  
FOUR-WHEELED GONDOLA CAR.

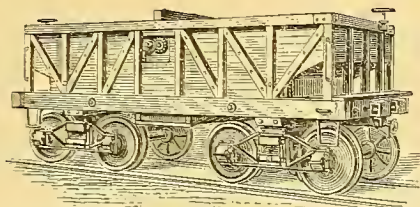


Fig. 20.

HOPPER-BOTTOM COAL CAR, Eight-wheeled.

(For details of modern car of this design, see Figs. 109-112.)

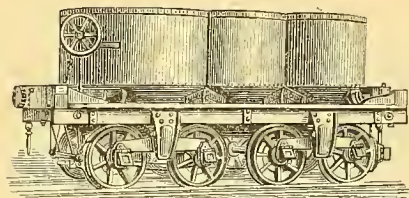


Fig. 21.

IRON-HOPPER COAL CAR.

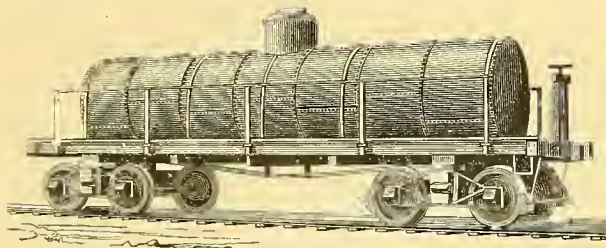


Fig. 22.

TANK CAR OR OIL CAR.

(For details, see Figs. 139-142.)

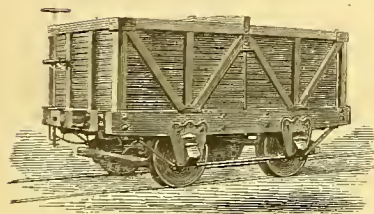
Usual capacity 3,700 to 3,850 gallons,  
weighing 7.3 lbs. per gallon.

Fig. 23.

FOUR-WHEELED HOPPER-BOTTOM COAL CAR.

(For details, see Figs. 105-108.)

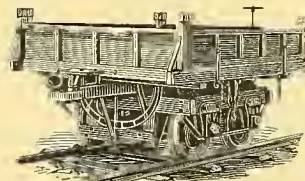


Fig. 24.

FOUR-WHEELED TIP CAR.

(For details, see Fig. 143.)

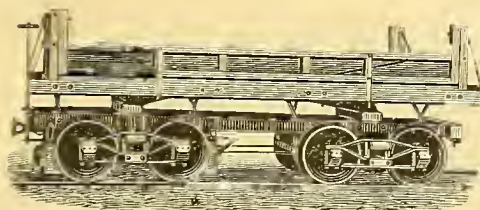


Fig. 25.

EIGHT-WHEELED TIP CAR.

PENNSYLVANIA RAILROAD.

(See Figs. 39-40 for dimensions; other designs of eight-wheeled tip cars are also built.)

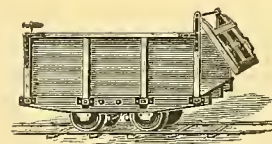


Fig. 26.

MINE CAR.



## STANDARD TYPES: PENNSYLVANIA RAILROAD AND ALLIED LINES.

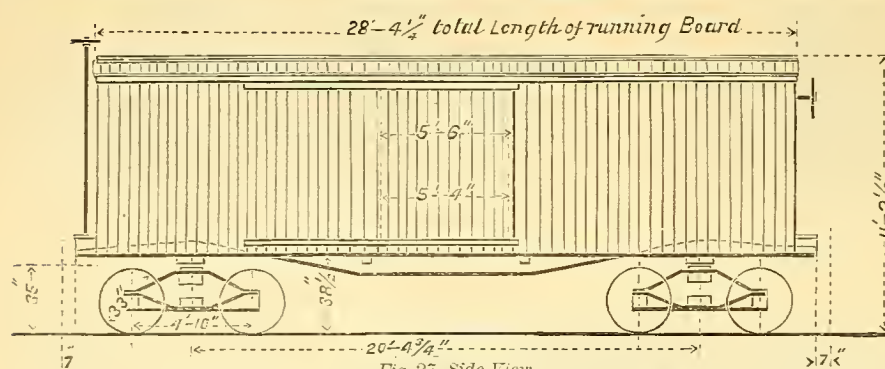


Fig. 27, Side View.

BOX CAR. (Old standard; a new and much larger standard shown in Fig. 43.)  
Weight, 20,900 lbs. Capacity, 30,000 lbs. Length of frame, 29' 10 3/4". 31' 6 3/4" from face to face of drawbar.

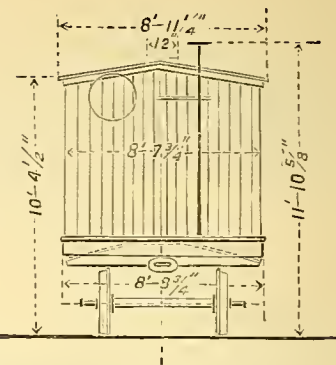


Fig. 28, End View.

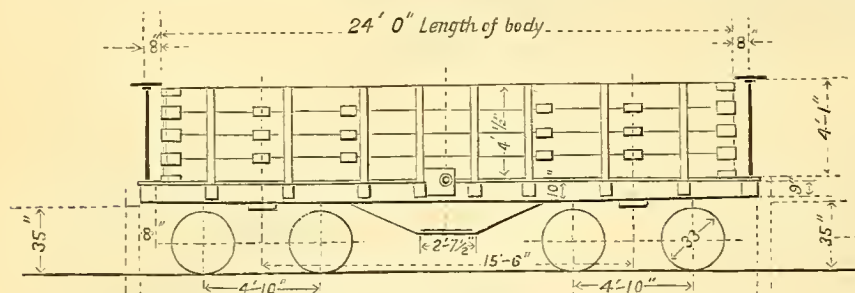


Fig. 29, Side View.

HOPPER-BOTTOM GONDOLA CAR (short). Weight, 19,800 lbs. Capacity, 50,000 lbs.  
Length of frame, 26' 0". 27' 2" from face to face of drawbar.

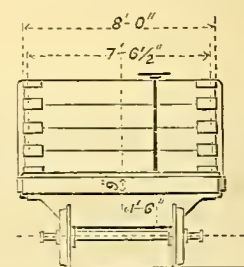


Fig. 30, End View.

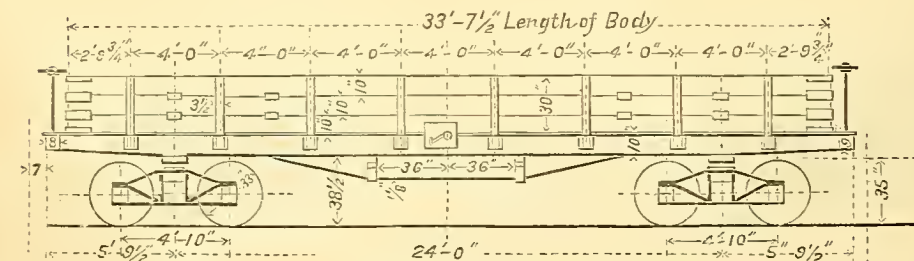


Fig. 31, Side View.

HOPPER-BOTTOM GONDOLA CAR (long). Weight, 23,200 lbs. Capacity, 40,000 lbs.  
Length of frame, 35' 7". 36' 9" from face to face of drawbar.

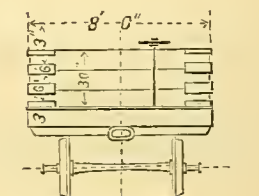


Fig. 32, End View.

## STANDARD TYPES: PENNSYLVANIA RAILROAD AND ALLIED LINES.

(A newer and larger design for this style of car is shown in Figs. 136-138)

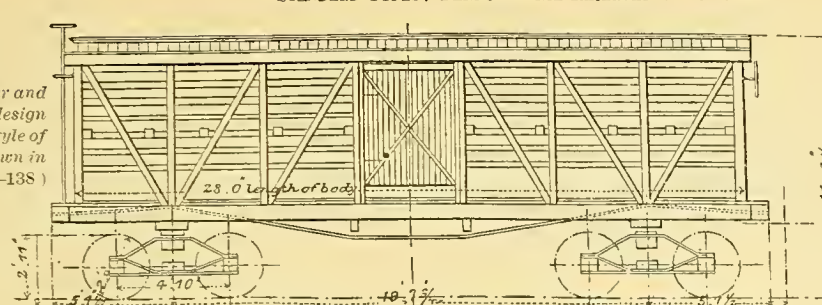


Fig. 33. STOCK CAR, with DOUBLE DECK. Weight, 21,000 lbs. Capacity, 22,400 lbs.  
Length of frame, 29' 10 3/4". 31' 0 3/4" from face to face of drawbar.

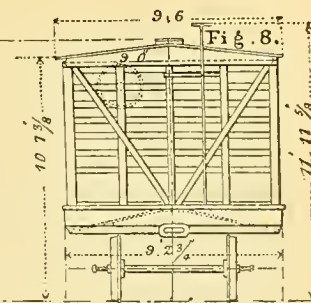


Fig. 34. End View.

(Cars of greater capacity of this general design are also built.)

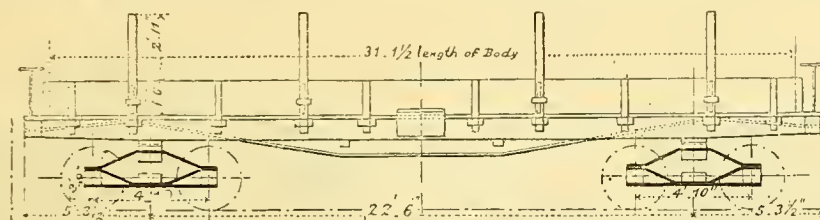


Fig. 35. GONDOLA OR PLATFORM CAR. Weight, 17,280 lbs. Capacity, 30,000 lbs.  
Length of frame, 33' 1". 34' 3" from face to face of drawbar. 30' 9 1/2" inside in the clear.

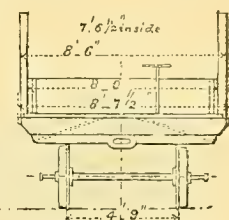


Fig. 36. End View.

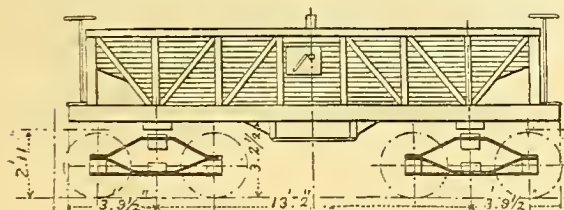


Fig. 37. COAL CAR. Weight, 16,000 lbs. Capacity, 28,000 lbs.  
Length of frame, 20' 9". 21' 11" from face to face of drawbar.

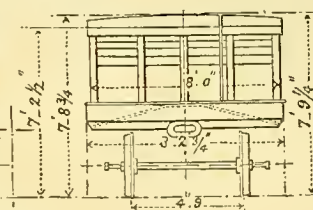


Fig. 38.

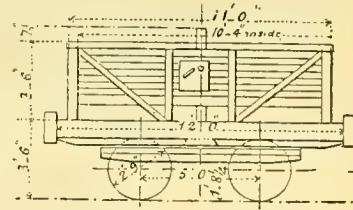


Fig. 41. ANTHRACITE COAL CAR.  
Weight, 7,600 to 7,900 lbs.  
Capacity, 13,000 lbs.

(Mainly used for grading and construction purposes, and not for coal.)

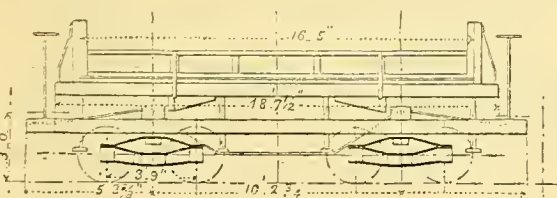


Fig. 39. GRAVEL CAR OR TIP CAR. Weight, 13,000 lbs. Capacity, 16,000 lbs.  
Length of frame, 20' 9 1/2". 21' 11 1/2" from face to face of drawbar.

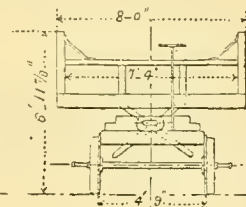


Fig. 40. End View.

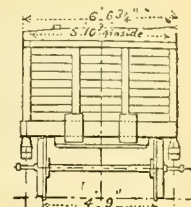


Fig. 42. End View.



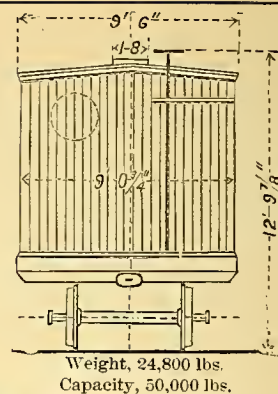
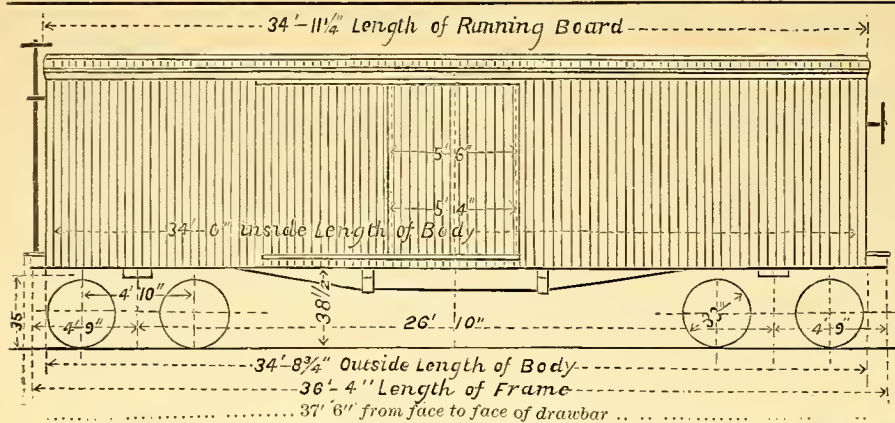


Fig. 43. Box Car (New Standard). PENNSYLVANIA RAILROAD.  
(A similar diagram of the New York, West Shore & Buffalo Box Car is shown in Fig. 98.)

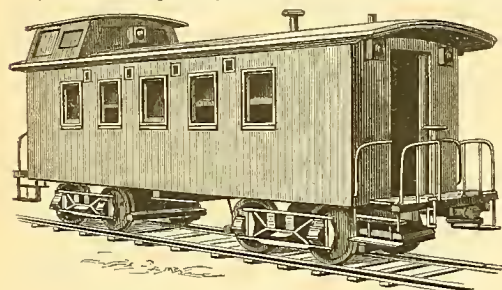


Fig. 44. CABOOSE CAR with LOOKOUT.  
(LOOKOUTS are in increasing use, but the majority of caboose cars do not have them.)

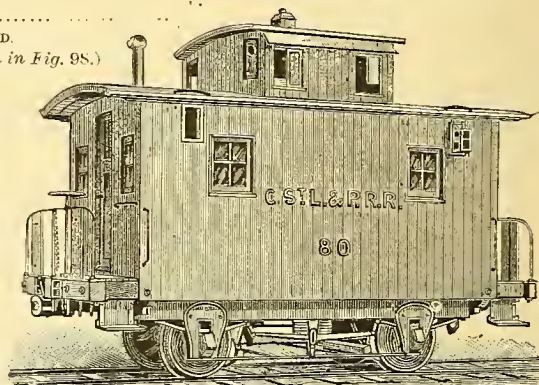


Fig. 45. FOUR-WHEELED CABOOSE CAR OR CABIN CAR, with LOOKOUT.

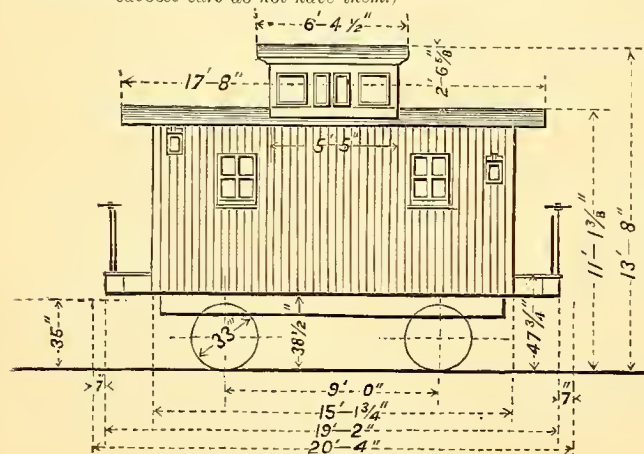


Fig. 46. Side Elevation of Fig. 45.

(Standard of Pennsylvania Railroad and allied lines. The old standard type of this car is shown in Fig. 104 1/2, with detail drawings, Figs. 102-4.)

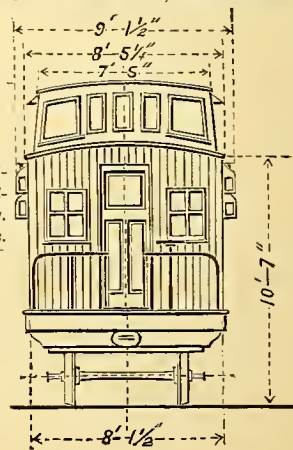


Fig. 47. End Elevation of Fig. 45.

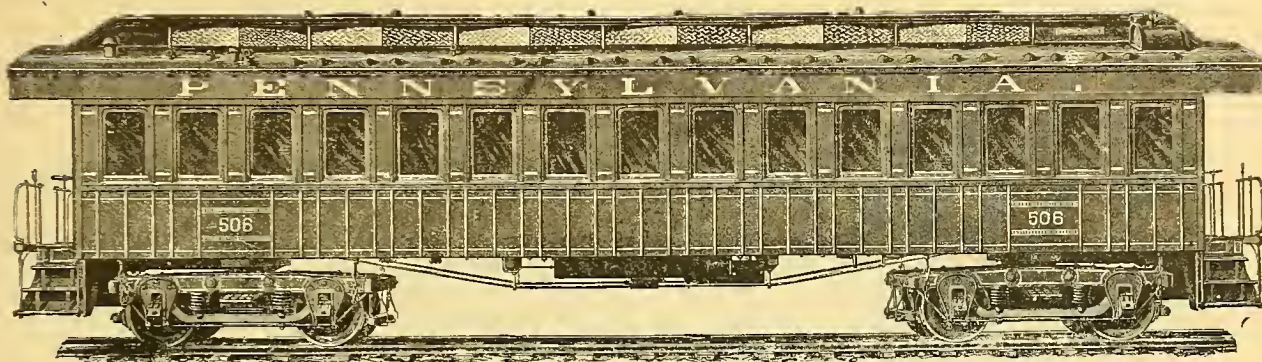


Fig. 48. PASSENGER CAR OR COACH, Pennsylvania Railroad and allied lines.  
(Side view to larger scale with brake attachments in Figs. 324-325; general dimensions in Figs. 62-63; also shown in detail under CAR-BODIES, PASSENGER; CAR-BODY DETAILS and FURNISHINGS.)

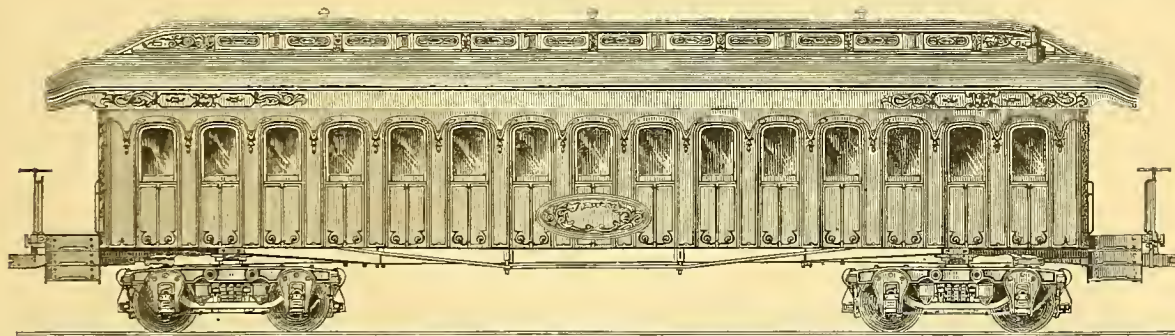


Fig. 49. PASSENGER CAR OR COACH.  
(Old style, especially in respect to style of decoration, height of steps from the track, name-panel and curved window-casings.)

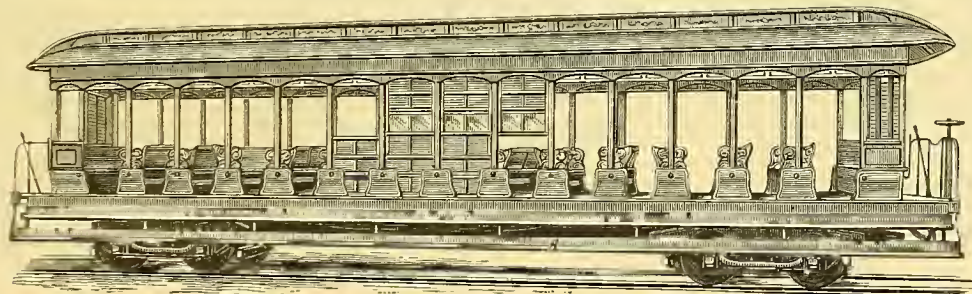


Fig. 49½. SUBURBAN EXCURSION CAR.  
(The more usual practice with these cars is to use canvas SIDE-CURTAINS instead of blind.)



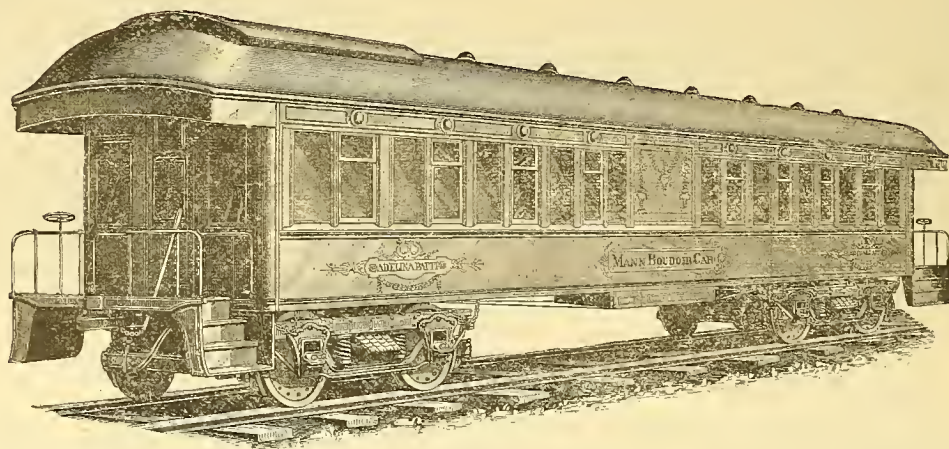


Fig. 50.  
MANN "BOUDOIR" SLEEPING CAR, with ARCHED ROOF.  
(For floor plan of this car, see Fig. 213.)

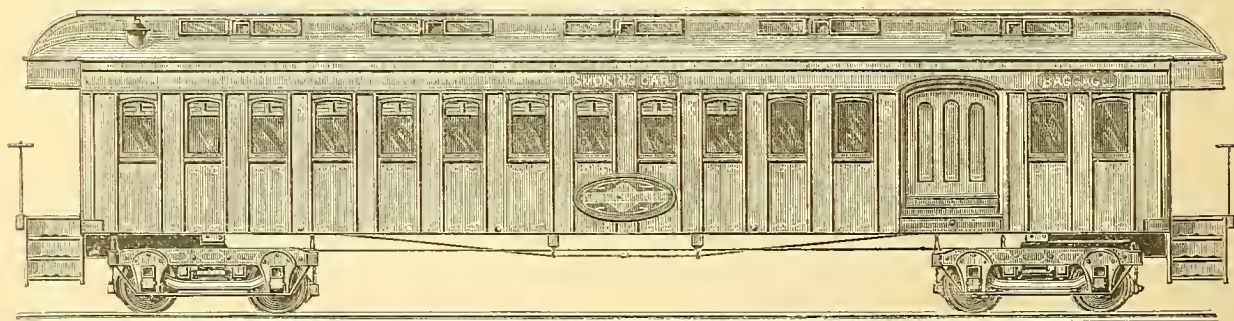


Fig. 51.  
COMBINATION COACH.  
(Combined Passenger and Baggage Car.)  
(Old style, in respect to the curved tops to the windows and doors, and the oval name-panel.)

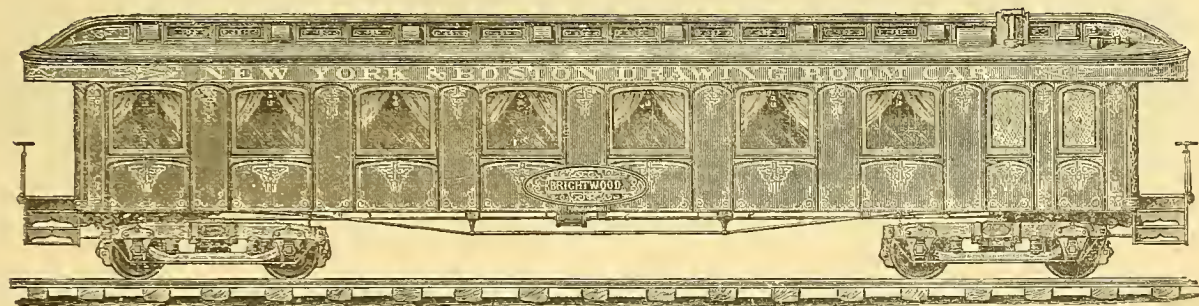


Fig. 52.

DRAWING-ROOM CAR OR PARLOR CAR.

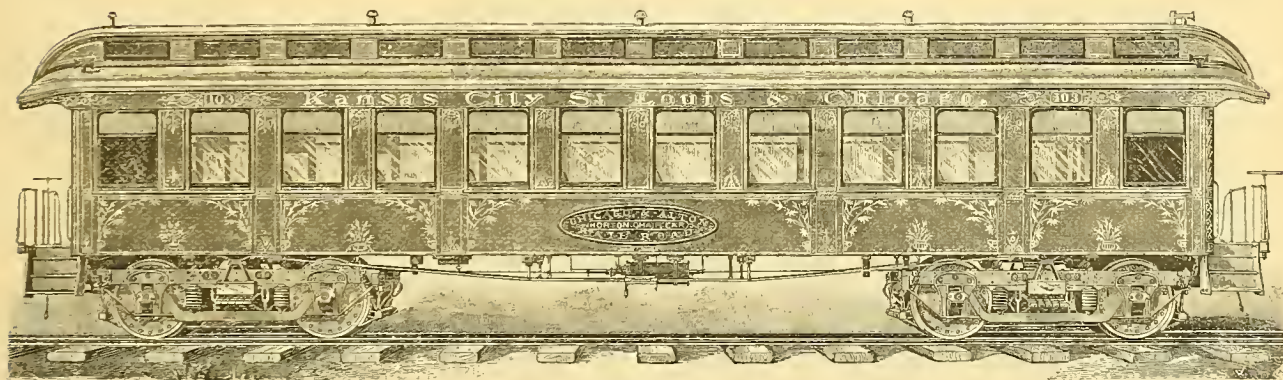


Fig. 53.

CHAIR CAR OR PARLOR CAR.

*(This car is shown in detail in Figs. 159-'60.)*



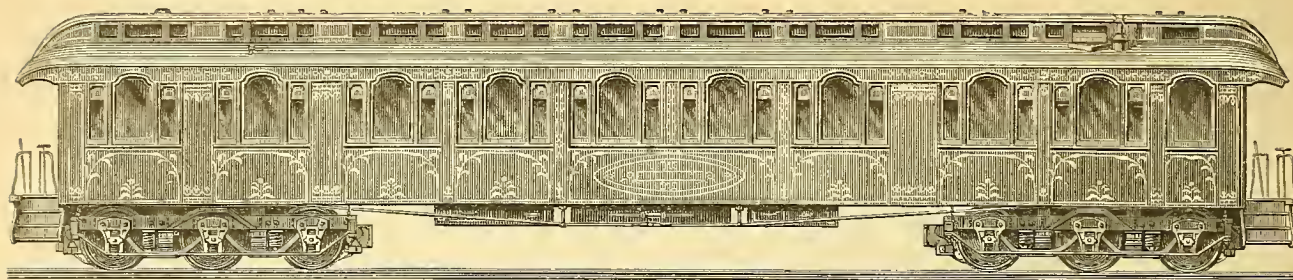


Fig. 54.

SLEEPING AND HOTEL CAR.

*(Old style in respect to window details and decorations.)*

Fig. 55.

SLEEPING CAR.

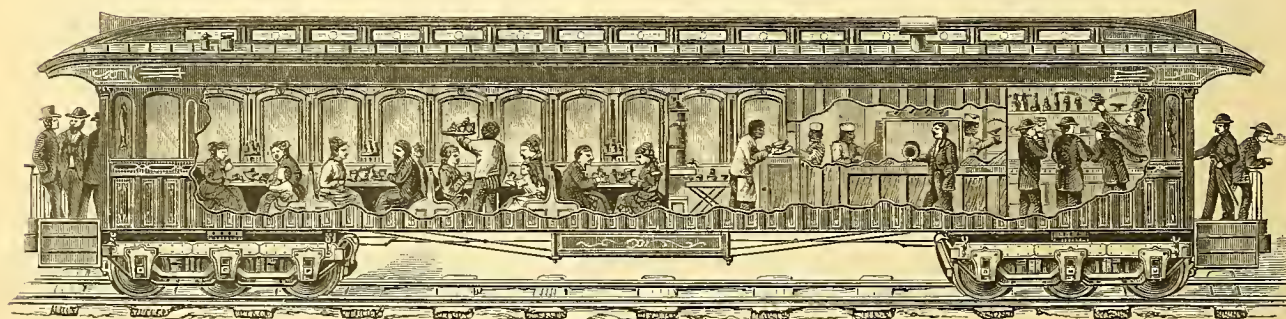
*(Modern style of finish and decoration.)*

Fig. 56.

DINING CAR.

*(Usually fitted with THEATRE SEATS for ease in going to and from the tables.)**(Old style in respect to windows and sub-divisions. For newer designs see Figs. 191-194 and 214.)*

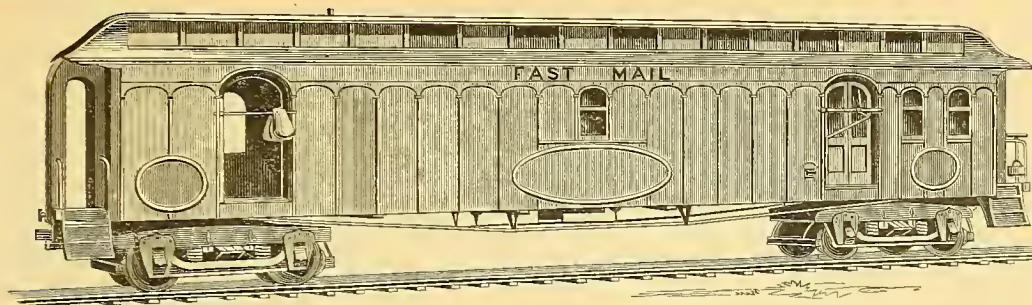


Fig. 57.

MAIL CAR OR POSTAL CAR.

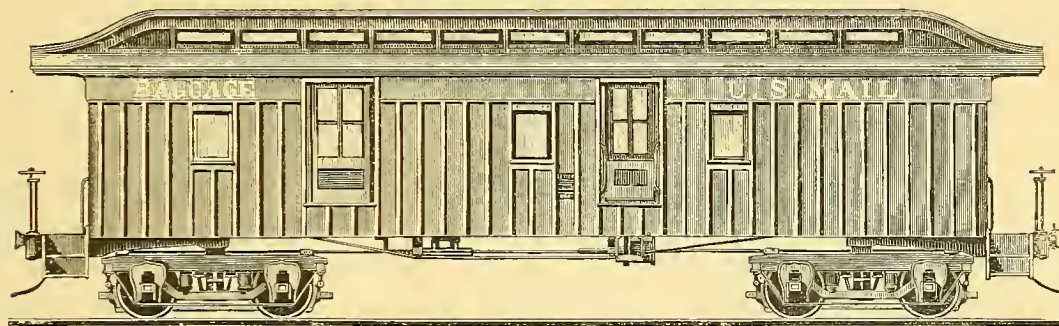
*(Old style in respect to curved paneling, although largely in use. For newer style, with dimensions, see Figs. 64-65.)*

Fig. 58.

COMBINATION BAGGAGE CAR.

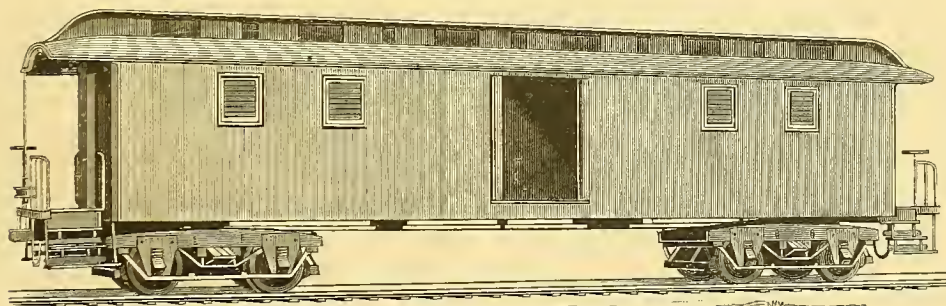
*(Combined Baggage and Express or Mail Car.)*

Fig. 59.

BAGGAGE OR EXPRESS CAR.

*(Figs. 58 and 59 are not of the most approved modern design, although largely in use. Figs. 64-65 more correctly represent current practice.)*



STANDARD TYPES: PENNSYLVANIA RAILROAD AND ALLIED LINES.

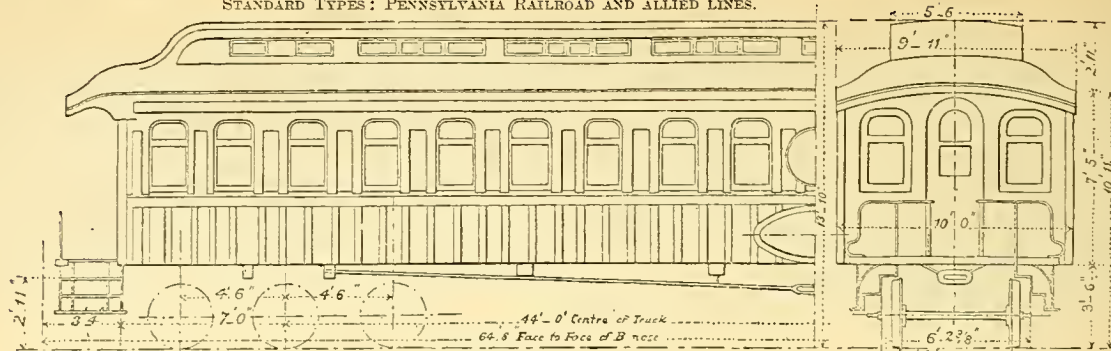


Fig. 60. SLEEPING CAR. Side View.  
(Two newer styles of sleeping car are also in use.)

Fig. 61. End View.

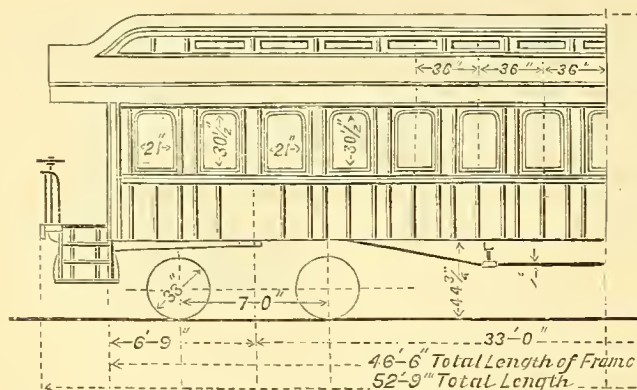


Fig. 62. PASSENGER CAR OR COACH. Side View.  
Weight, complete, 44,989 lbs. Weight, one truck, 7,200 lbs. Capacity, 51 passengers.

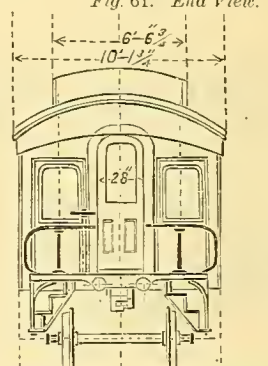


Fig. 63. End View.  
9'-8 3/4" Width of Frame

(For side view, see Fig. 48 or, to larger scale, Figs. 324-325. Also shown in detail under CAR BODIES, PASSENGER; CAR BODY DETAILS and FURNISHINGS.)

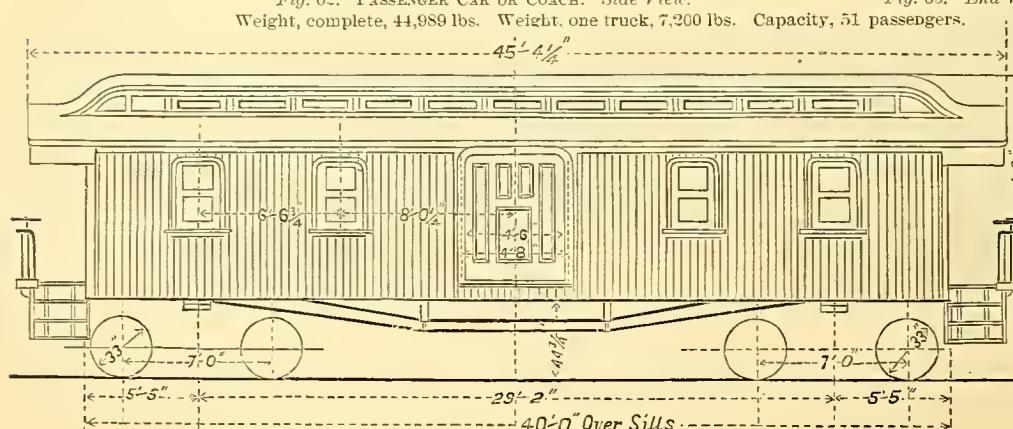


Fig. 64. BAGGAGE CAR. Weight, 32,000 lbs. Side View.

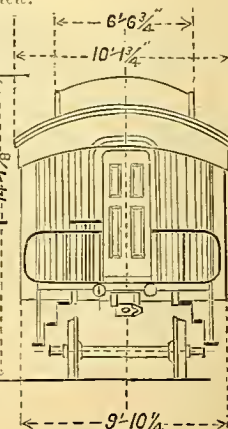


Fig. 65. End View.

STANDARD TYPES: PENNSYLVANIA RAILROAD AND ALLIED LINES.

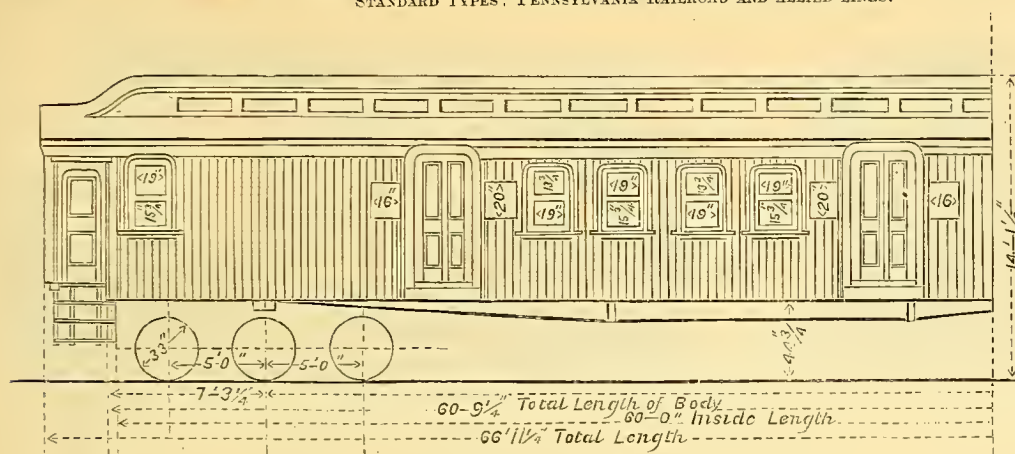


Fig. 66. Side View.

POSTAL OR MAIL CAR.

Weight, 58,000 lbs. Capacity, 10 tons.

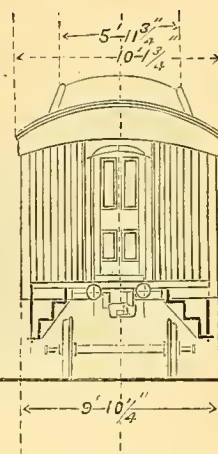


Fig. 67. End View.

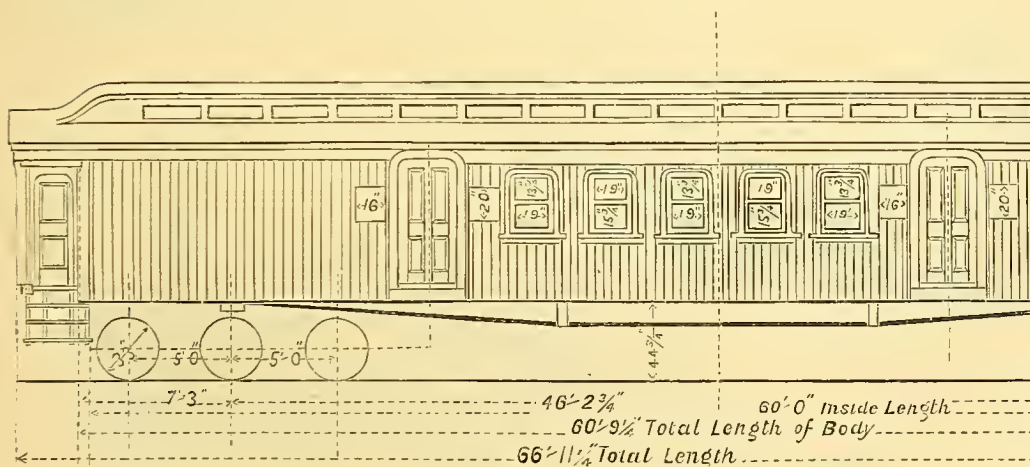


Fig. 68. Side View.

POSTAL OR MAIL CAR.

Weight, 56,700 lbs.

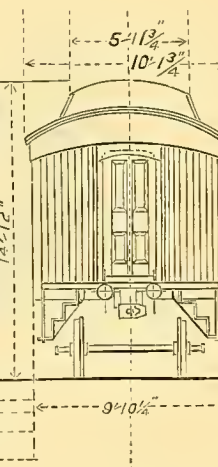


Fig. 69. End View.



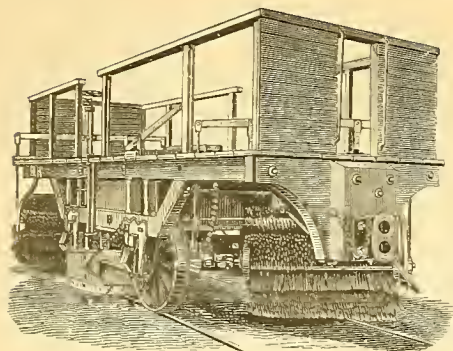


Fig. 70.  
SWEEPING CAR.  
A. Snow-scraper.

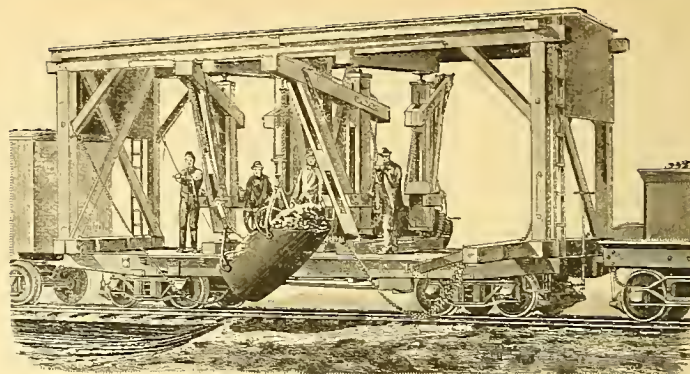


Fig. 71.  
DITCHING CAR.

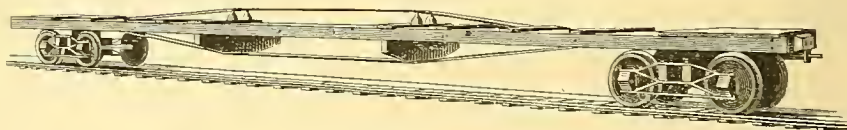


Fig. 72.  
FERRY PUSH CAR.

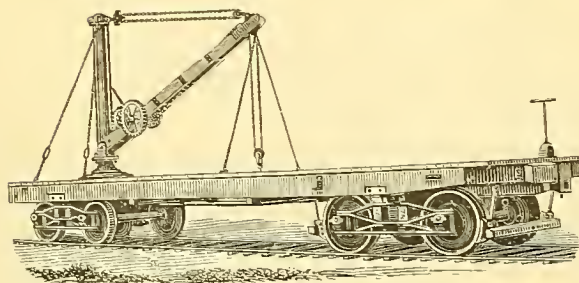


Fig. 73.  
DERRICK CAR OR WRECKING CAR.

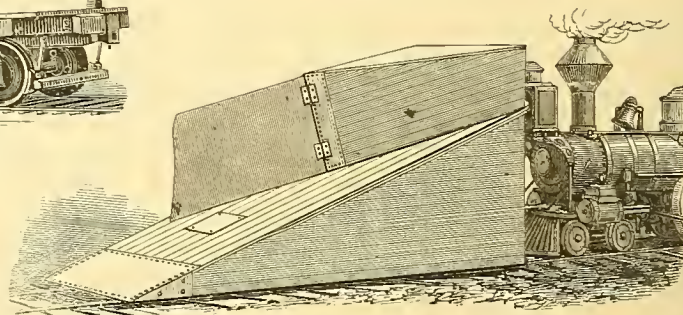


Fig. 74.  
SNOW-PLOW.

(Another style is shown in Fig. 81; see also SNOW-PLOW in Dictionary.)

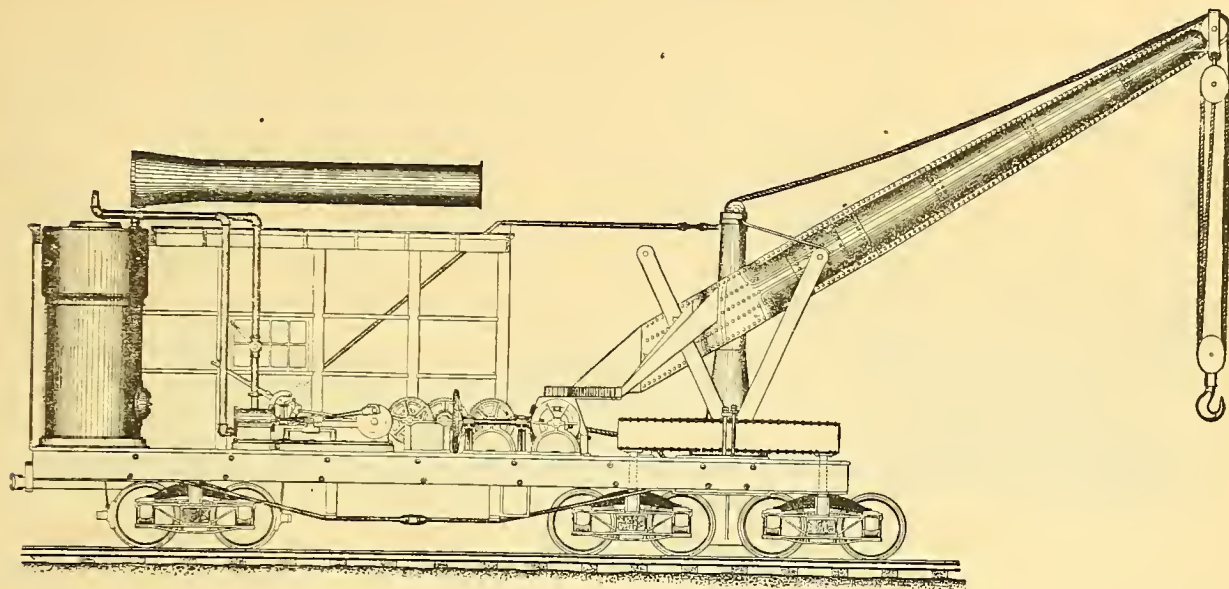


Fig. 75. Side View.  
(Scale 8 ft. to the inch.)

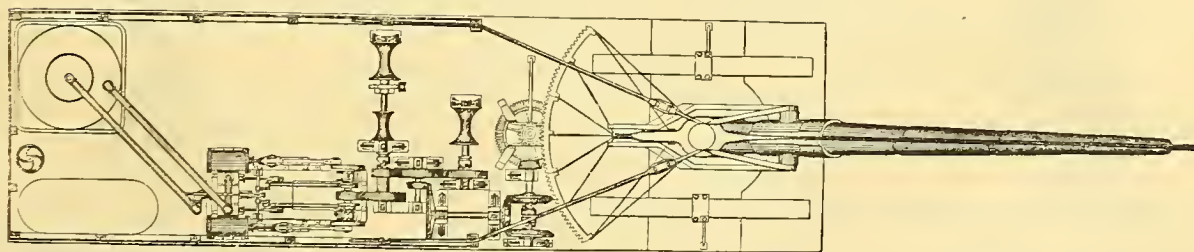


Fig. 76. Plan.

STEAM WRECKING OR DERRICK CAR;  
MICHIGAN CENTRAL, ATCHISON, TOPEKA & SANTA FE and CHICAGO & WESTERN INDIANA RAILROADS  
Radius of Boom, 22 ft. Capacity of TANK, 450 gals.  
(Names of the principal details are approximately given in Figs. 77-79.)



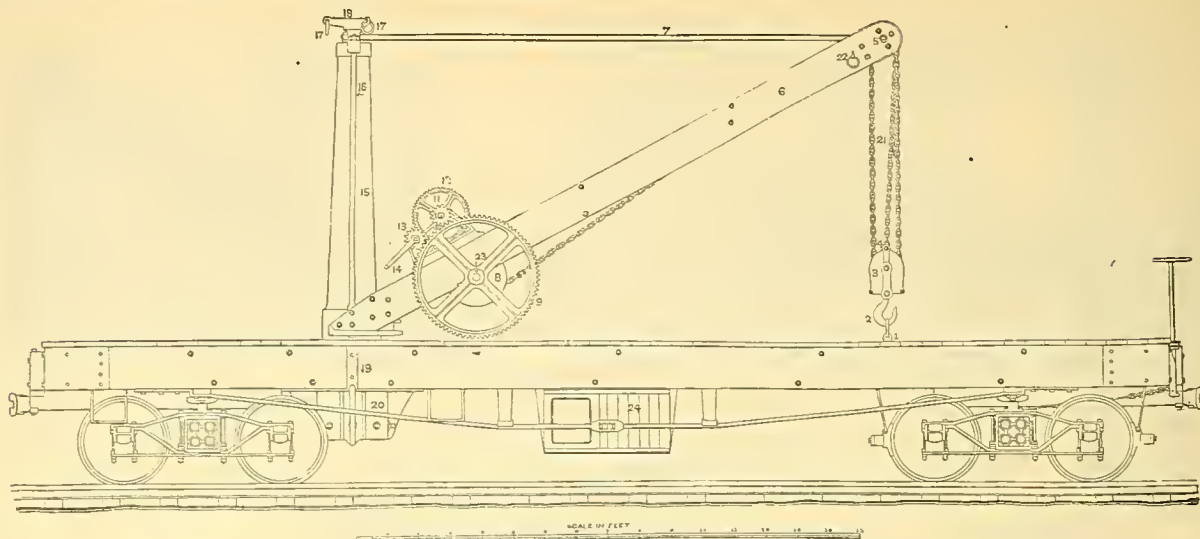


Fig. 77. Elevation.

HAND DERRICK OR WRECKING CAR.

## NAMES OF PARTS: Figs. 77-78.

- |   |  |
|---|--|
| 1. Eye-bolt.                            | 12. Intermediate Spur-wheel.                   |
| 2. Sheave-hook, or Hoisting Hook.       | 13. Shifting pinion.                           |
| 3. Hoisting-block (with two Sheaves).   | 14. Crank, on the Driving-shaft.               |
| 4. Hoisting-block Clevis.               | 15. Mast.                                      |
| 5. Pintle, or Sheave-pin.               | 16. Boom-shoe Rods, supporting Boom-shoe.      |
| 6. (Fig. 77) Boom. (White Oak.)         | 17. Guy-rings.                                 |
| 6. (Fig. 78) Head casting for Boom.     | 18. Head-block, revolving on a Head-block Pin. |
| 7. Stay-rods, or Tension-rods.          | 19. Derrick Truss-rod.                         |
| 8. Drum or Spool.                       | 20. Mast-pocket.                               |
| 9. Spur-gear (keyed to Drum-shaft, 23). | 21. Hoisting-chain.                            |
| 10. Intermediate Shaft.                 | 22. Slewing-rings.                             |
| 11. Intermediate Pinion.                | 23. Drum-shaft.                                |
|   | 24. Tool-box.                                  |

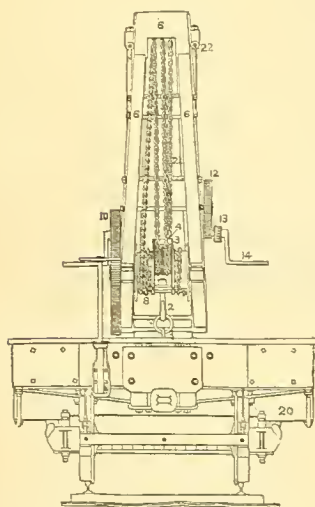


Fig. 78. End Elevation of Fig. 77.

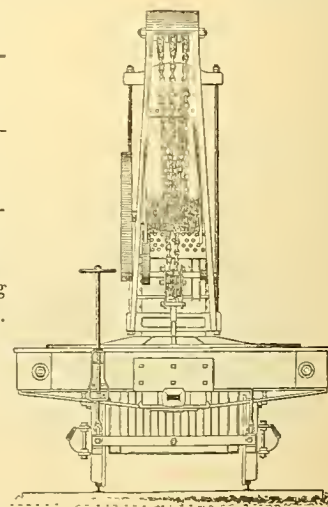


Fig. 79. End Elevation of Fig. 80.

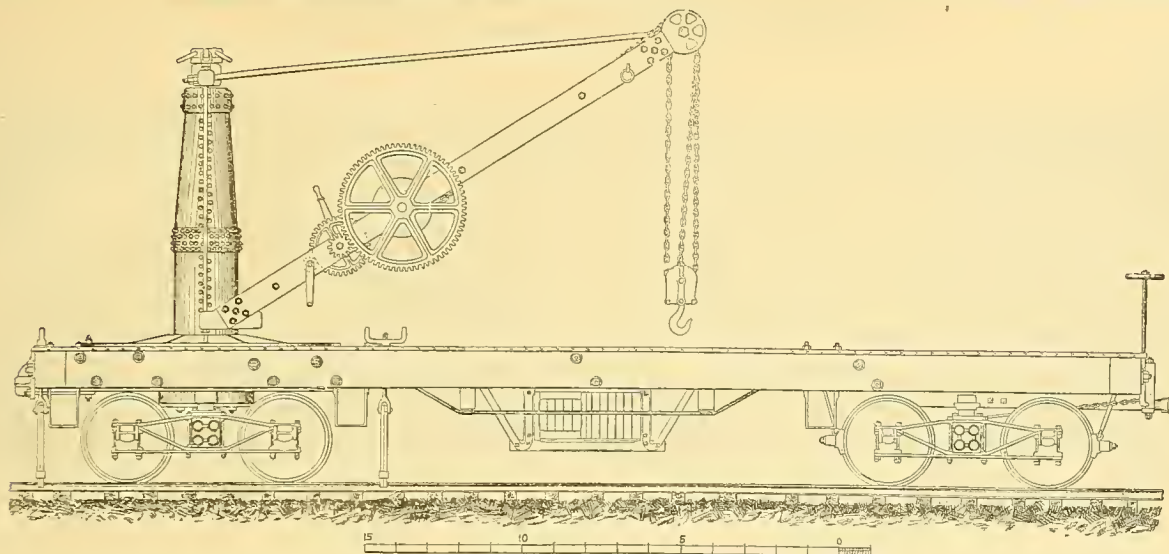


Fig. 80. Side Elevation.

HAND WRECKING OR DERRICK CAR, 10 TON CRANE.

(Another style of Wrecking Car is shown in Figs. 144-153.)

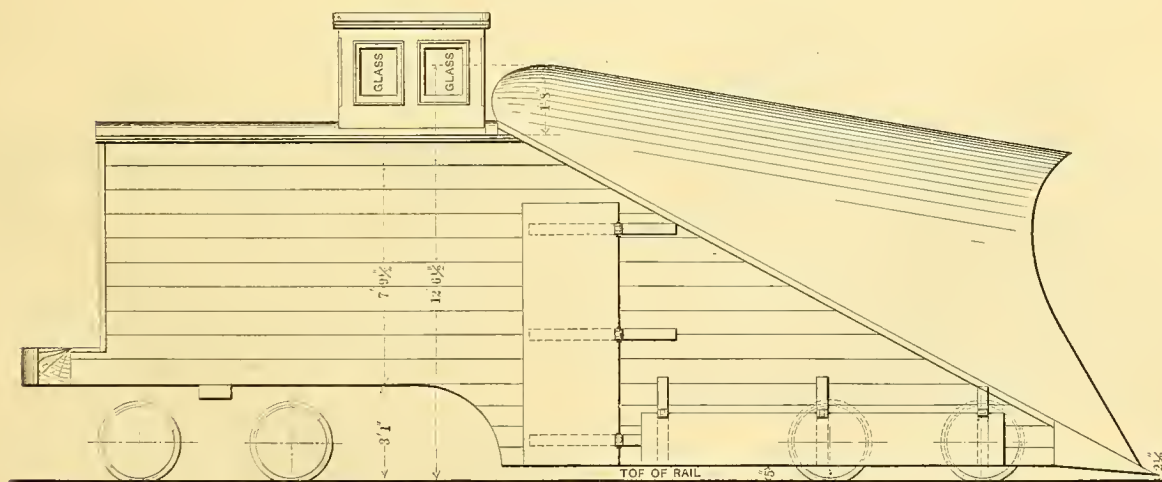


Fig. 81. SNOW-PLOW.

NEW YORK, WEST SHORE &amp; BUFFALO RAILWAY.

(Another style is shown in Fig. 74; see also SNOW-PLOW, in Dictionary.)



Numbers refer to List of Names of Parts with Figs. 95-96.

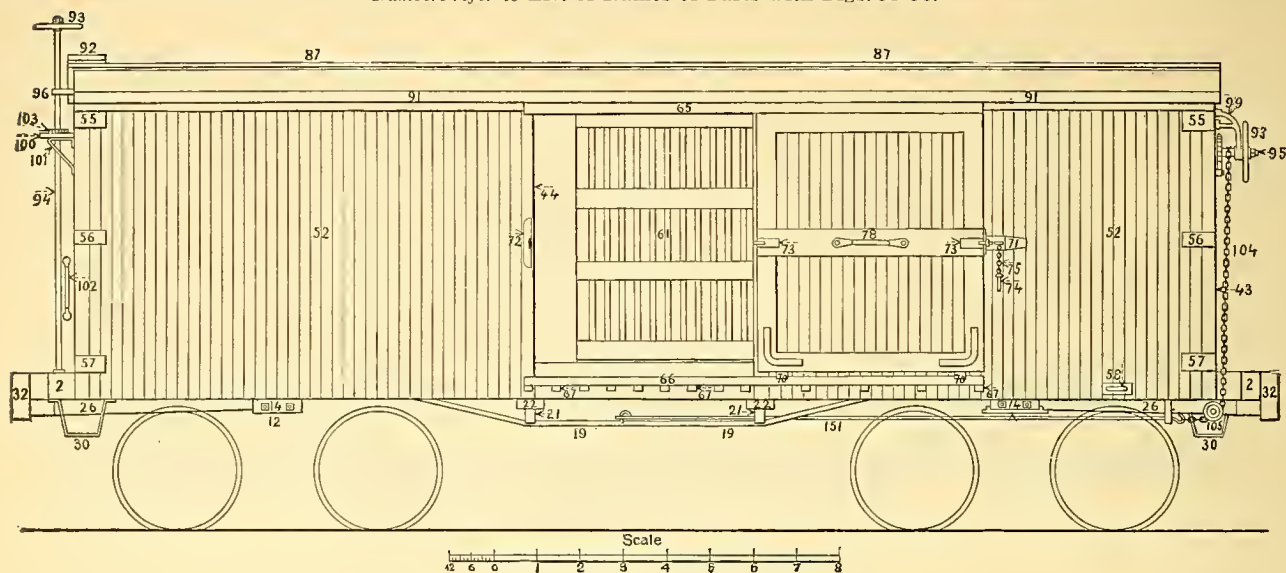
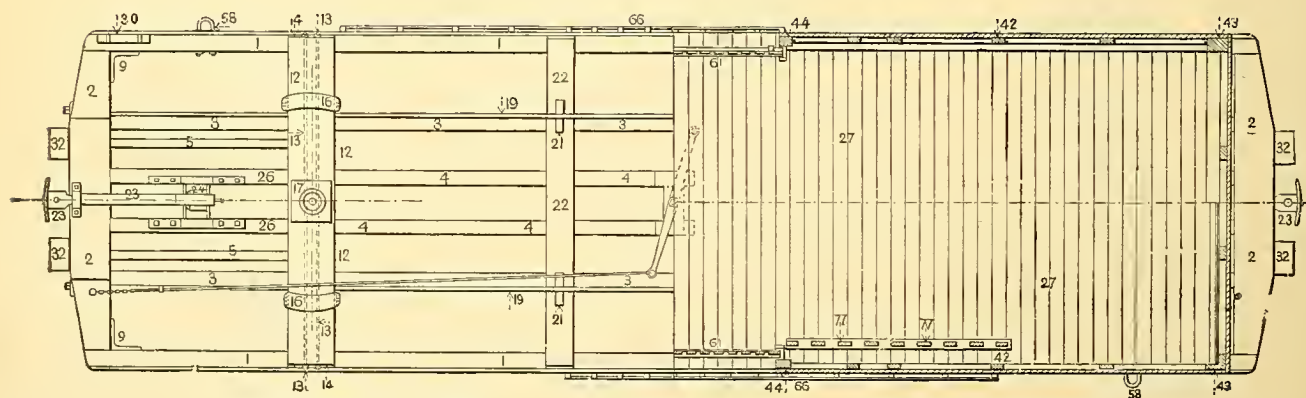


Fig. 82. Side View.



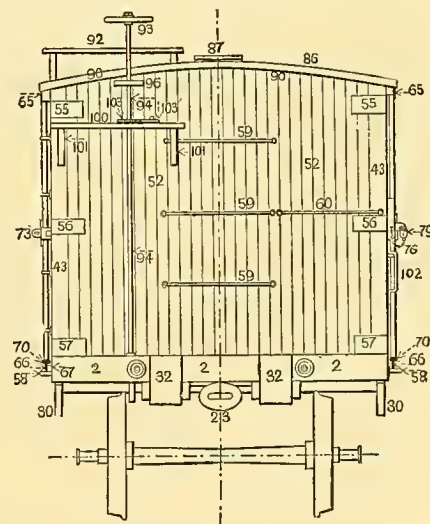
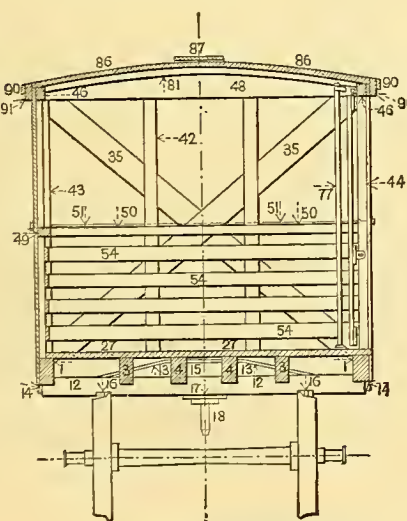
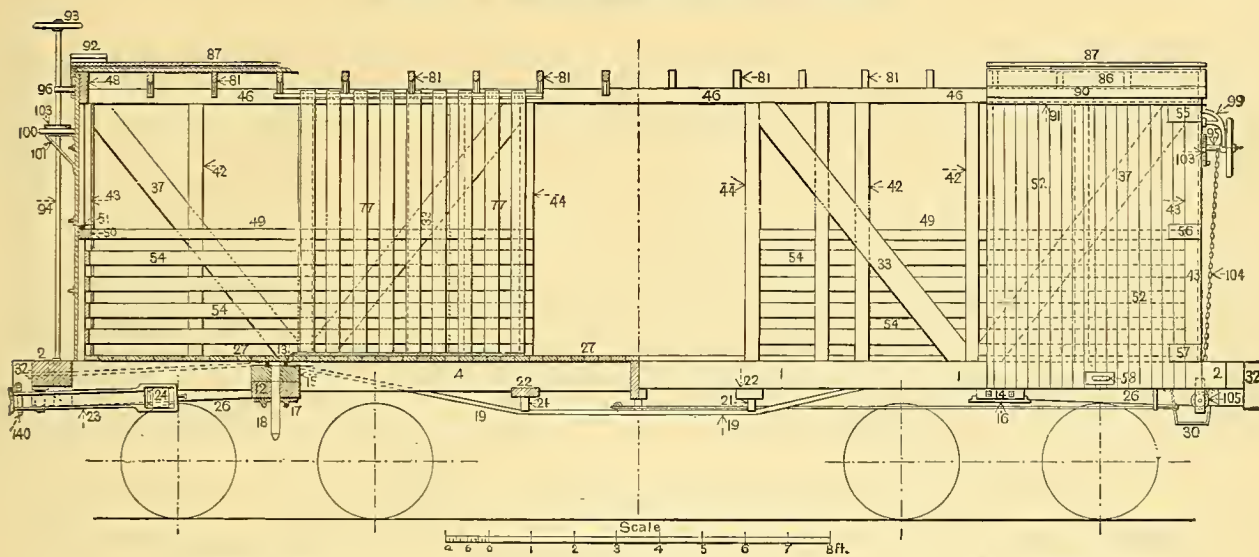
Half Plan, showing Framing.

Fig. 83.

Half Plan, showing Floor.

BOX-CAR BODY, CENTRAL RAILROAD OF NEW JERSEY.

*Numbers refer to List of Names of Parts with Figs. 95-96.*



BOX-CAR BODY, CENTRAL RAILROAD OF NEW JERSEY.



Numbers refer to List of Names of Parts with Figs. 95-96.

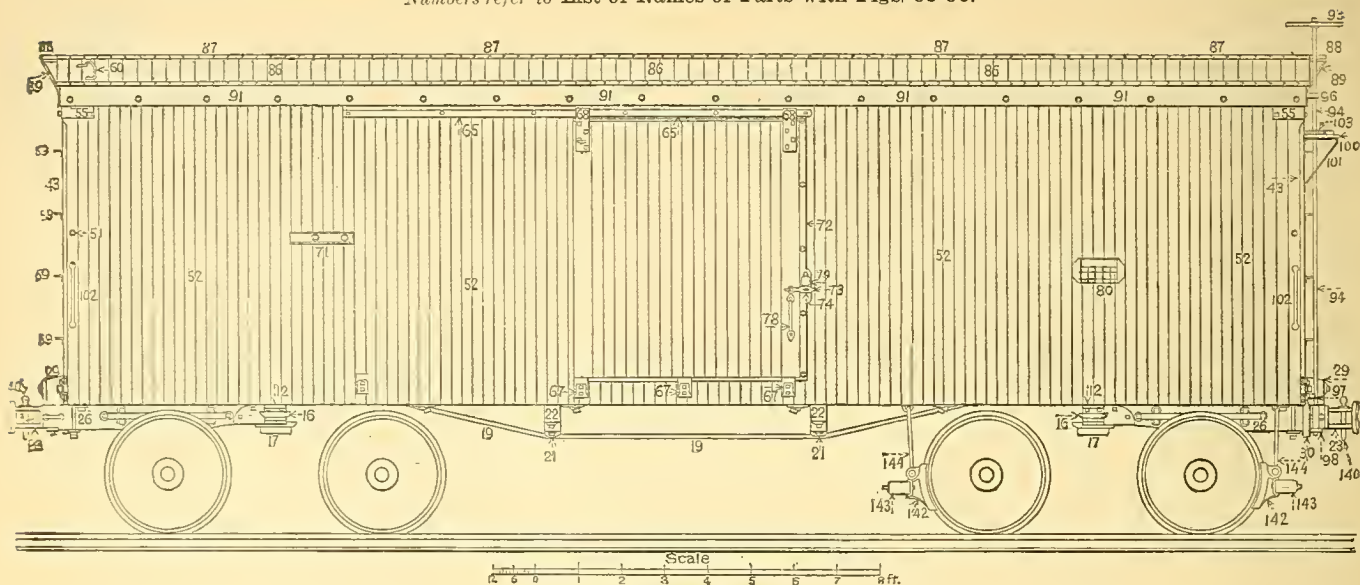
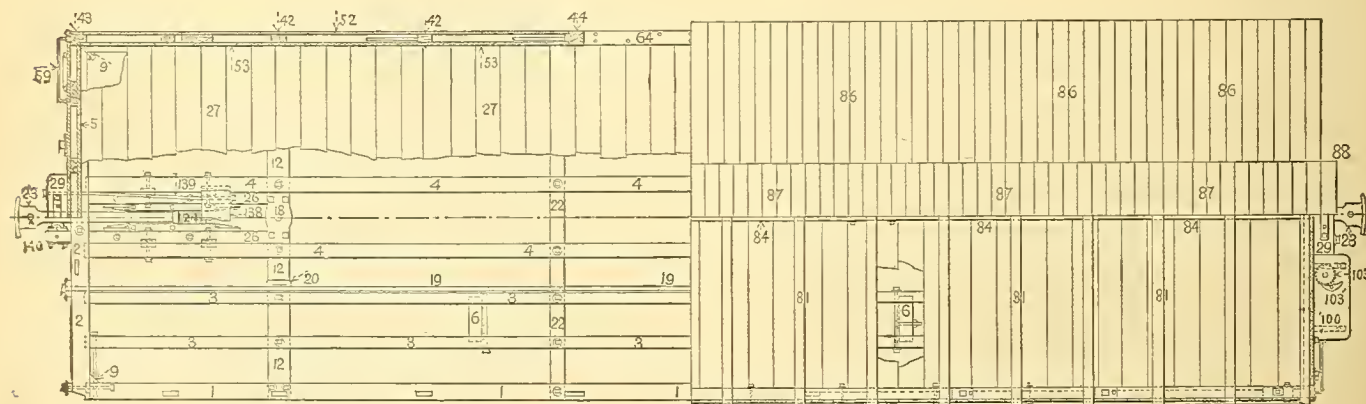


Fig. 87. Side View.



Half Plan, showing Framing.

Fig. 88.

Half Plan, showing Roof.

BOX-CAR BODY, NEW YORK CENTRAL & HUDSON RIVER RAILROAD.

(Old standard; for new, see Figs. 93-96.)

Numbers refer to List of Names of Parts with Figs. 95-96.

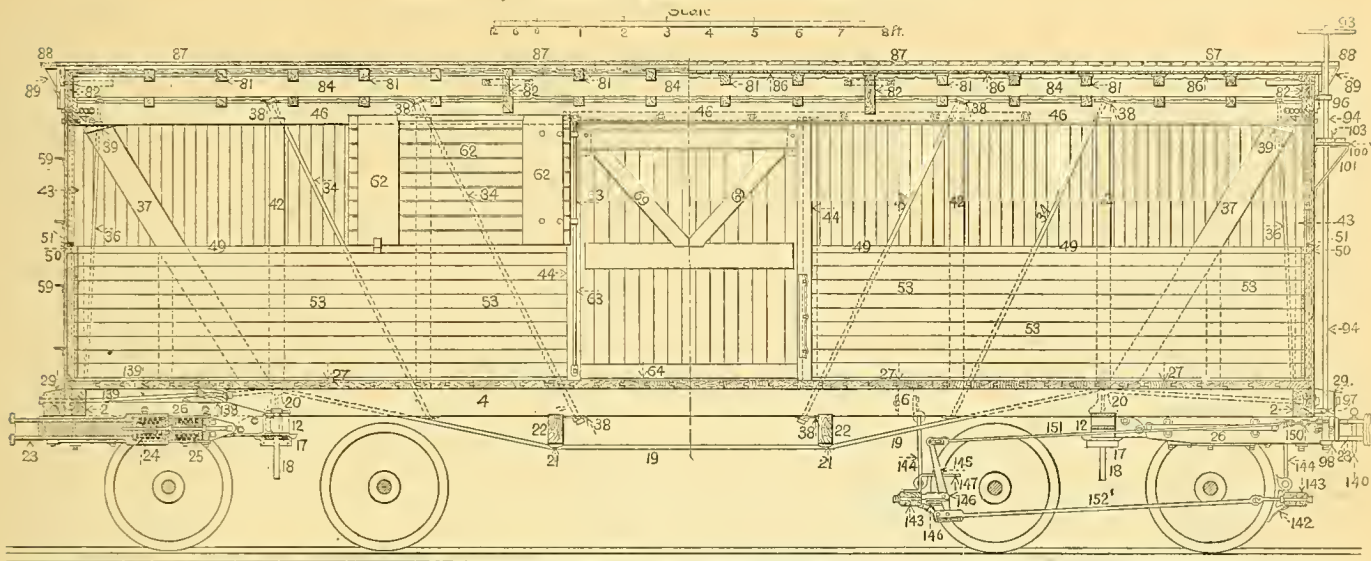
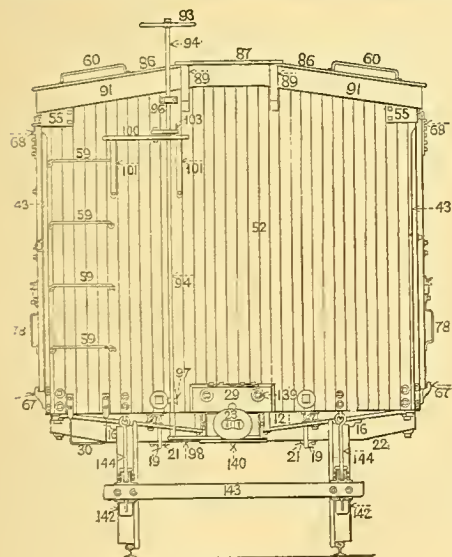
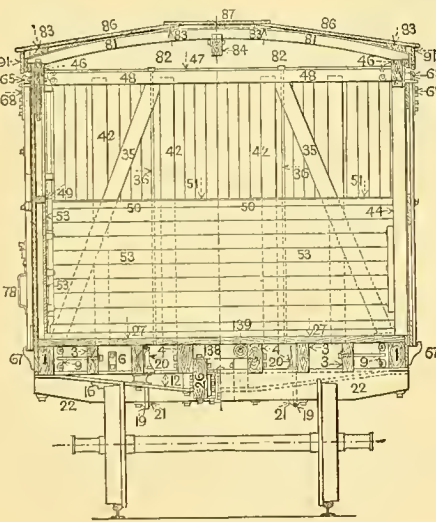
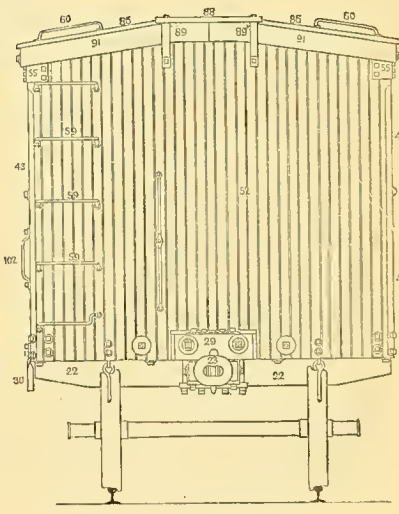
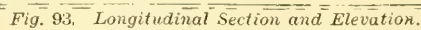


Fig. 89. Longitudinal Section.

Fig. 90.  
End View.Fig. 91.  
Transverse Section.Fig. 92.  
End View.

BOX-CAR BODY, NEW YORK CENTRAL & HUDSON RIVER RAILROAD.  
(Old standard; for new, see Figs. 93-96.)











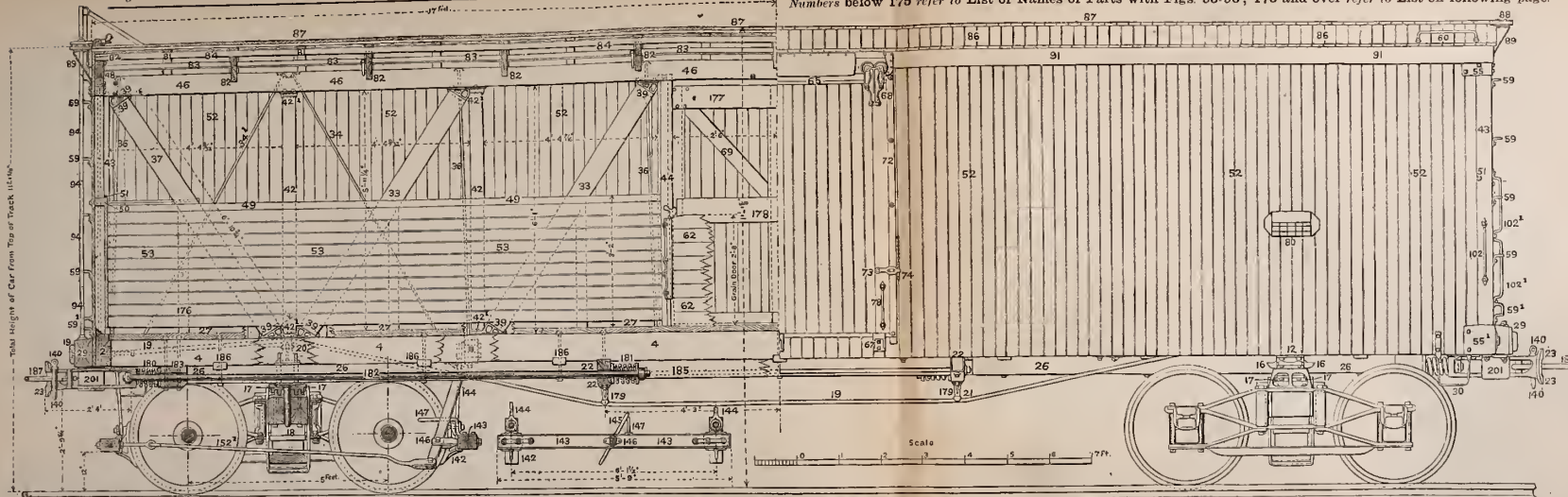


Fig. 93. Longitudinal Section and Elevation.

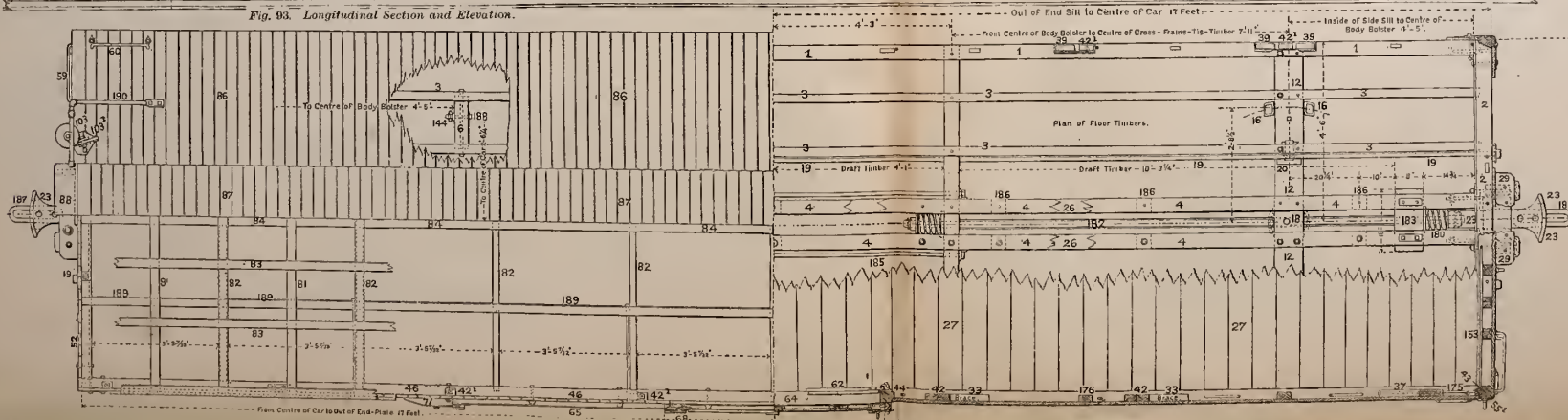


Fig. 94.

Numbers below 175 refer to List of Names of Parts with Figs. 95-96; 175 and over refer to List on following page.

STANDARD BOX CAR, NEW YORK CENTRAL & HUDSON RIVER RAILROAD AND ALLIED LINES.

(Figs. 93-96),  
with HOT DRAW-GEAR (Figs. 426-427)  
and BRAKE-SHAFT GEAR of Figs.  
252-254.  
Capacity..... 40,000 lbs.  
Weight..... lbs.

Weights in Detail.  
Wrought iron in car-body, 2,552 lbs.  
Cast " " " 797 "  
Steel " " " 104 "  
Malleable " " " 1394 "  
Wrought iron in trucks, including axles..... 3,144 "  
Cast iron in trucks, including wheels..... 5,306 "  
Malleable iron in trucks..... 48 "  
Journal bearings..... 80 "

SPECIFICATIONS.  
Axles: Hammered iron, "M. C. B. standard."  
Wheels: 525 lbs. each, and guaranteed for three years. Pressed upon axles at a pressure not less than 60,000 lbs.  
Springs: N. & A. Middleton's twenty-ton bolster.

Card-cases: Two metal card-cases, 12 x 9 1/2 in. Inside, with wire rack, and strip of rubber over top to keep off the rain, blocked out on washers 1/4 in. for circulation of air.

Bolts and Nuts: All bolt-heads and nuts to be let in flush on inside of car and all sharp corners removed.

Painting: Car-body, three coats mineral paint. Iron-work exposed to view, one coat of gloss black. Trucks, two coats of mineral paint. Roof, top of floor timbers, outside and top of sills, and all mortises and tenons, one coat mineral paint.

Weights: To be marked on the right-hand lower corner of both sides of car, and over the weight the words and figures, "Capacity 40,000 lbs."

Screw-threads: Standard of M. C. B. Association.



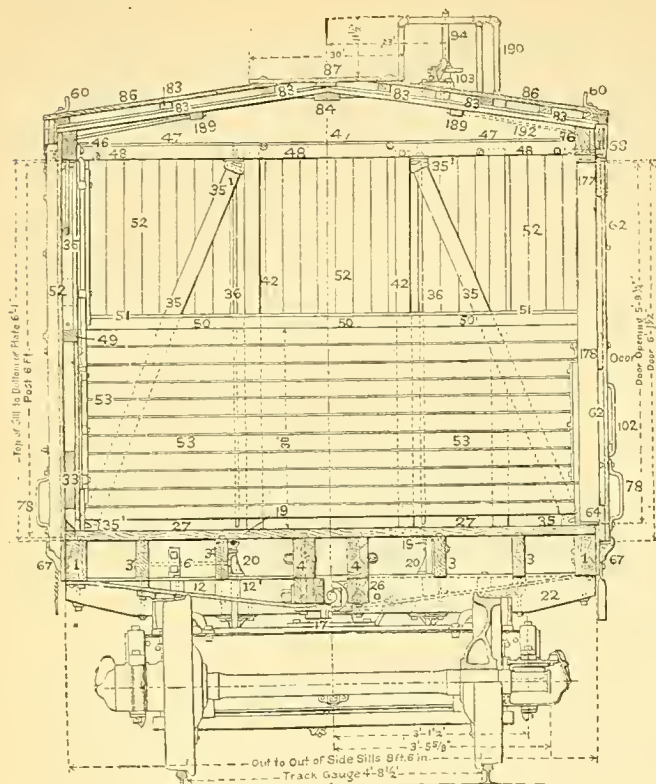


Fig. 95. Transverse Section.

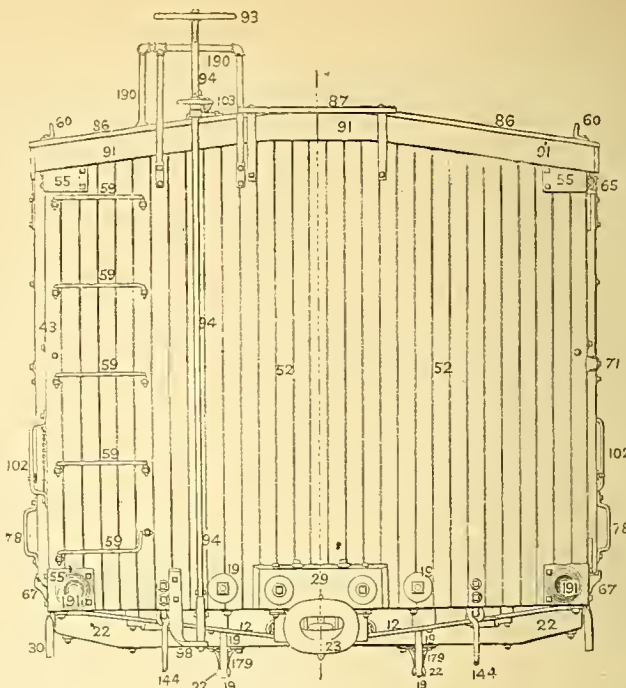


Fig. 96. End View.

Figs. 93-96. STANDARD BOX CAR, NEW YORK CENTRAL & HUDSON RIVER RAILROAD AND ALLIED LINES.

NAMES OF PARTS SPECIAL TO FIGS. 93-96 IN ADDITION TO GENERAL LIST (OF NUMBERS BELOW 175) ON THE FOLLOWING PAGE.

- 175. End-brace Tie-rod.
- 176. Body Counterbrace Tie-rod.
- 177. Door Cap.
- 178. Door Centre-girth.
- 179. Queen Post or Body Truss-rod Bearing.
- 180. Buffer-spring.
- 181. Draw-spring.
- 182. Draw-rod.
- 183. Follower-plate Block.
- 185. Cross-frame Tie-rods or Centre Draw-rods.

- 186. Packing-blocks.
- 187. Link.
- 188. Brake-hanger Bolt.
- 189. Plate-bolt Strip.
- 190. Brake Hand-rail.
- (See also Figs. 252-4.)
- 191. Push-block, on the Lower Corner-plate.
- 192. Short Plate-rods.
- 201. Draw-bar Carry-iron.

LIST OF NAMES OF PARTS OF BOX-CAR BODIES; *Figs. 82-101.*

- |                                      |                                     |                                      |                                    |
|--------------------------------------|-------------------------------------|--------------------------------------|------------------------------------|
| 1. <i>Side-sill.</i>                 | 32. <i>Dead-bloeks.</i>             | 60. <i>Roof Grab-iron.</i>           | 93. <i>Brake-wheel.</i>            |
| 2. <i>End-sill.</i>                  | 32'. <i>Buffer-beam.</i>            | 61. <i>Grated-door.</i>              | 94. <i>Brake-shaft</i>             |
| 3. <i>Intermediate-sills.</i>        | 33. <i>Side Body-brace.</i>         | 62. <i>Grain-door.</i>               | 95. <i>Horizontal Brake-shaft.</i> |
| 4. <i>Centre-sills.</i>              | 34. <i>Side Body-brace Rod.</i>     | 63. <i>Grain-door Rod.</i>           | 96. <i>Upper Brake-shaft</i>       |
| 5. <i>Short Floor-timber.</i>        | 34'. <i>End Body-brace Rod.</i>     | 64. <i>Door-sill.</i>                | <i>Bearing.</i>                    |
| 6. <i>Brake hanger Timber.</i>       | 35. <i>End Body-brace.</i>          | 65. <i>Top Door-track.</i>           | 97. <i>Lower Brake-shaft</i>       |
| 7. <i>Floor-timber Distance-</i>     | 35'. <i>End Body-brace Pocket.</i>  | 66. <i>Bottom Door-track.</i>        | <i>Bearing.</i>                    |
| <i>block.</i>                        | 36. <i>Sill-and-plate Rod.</i>      | 67. <i>Door-track Bracket.</i>       | 98. <i>Brake-shaft Step.</i>       |
| 8. <i>Floor-timber Braces.</i>       | 37. <i>Body Counterbrace.</i>       | 68. <i>Door-hanger.</i>              | 99. <i>Brake-shaft Bracket.</i>    |
| 9. <i>Sill Knee-iron.</i>            | 37'. <i>Body Counterbrace Rod.</i>  | 69. <i>Door-brace.</i>               | 100. <i>Brake-step.</i>            |
| 10. <i>Sill Tie-rod.</i>             | 38. <i>Brace-rod Washer.</i>        | 70. <i>Door-shoe.</i>                | 101. <i>Brake-step Bracket.</i>    |
| 11. <i>Transverse Floor-timbers.</i> | 39. <i>Brace-pocket.</i>            | 71. <i>Open-door Stop.</i>           | 102. <i>Corner Grab-iron.</i>      |
| 12. <i>Body-bolster.</i>             | 40. <i>Right-hand Brace-pocket.</i> | 72. <i>Closed-door Stop.</i>         | 102'. <i>End Grab-iron.</i>        |
| 12'. <i>Body-bolster Spacing-</i>    | 41. <i>Double Brace-pocket.</i>     | 73. <i>Door-hasp.</i>                | 103. <i>Brake Ratchet-wheel.</i>   |
| <i>block.</i>                        | 42. <i>Body-post.</i>               | 74. <i>Door-pin.</i>                 | 103'. <i>Brake-pawl.</i>           |
| 13. <i>Body-bolster Truss-rod.</i>   | 42'. <i>Body-post Pocket.</i>       | 75. <i>Door-pin Chain.</i>           | 104. <i>Horizontal Brake-shaft</i> |
| 14. <i>Body-bolster Truss-rod</i>    | 43. <i>Corner-post.</i>             | 76. <i>Lock-chain.</i>               | <i>Chain.</i>                      |
| <i>Washer.</i>                       | 44. <i>Door-post.</i>               | 77. <i>Door-guards.</i>              | 105. <i>Brake-shaft-chain</i>      |
| 15. <i>Body-bolster Truss-block.</i> | 44'. <i>Door-post Pocket.</i>       | 78. <i>Door-handle.</i>              | <i>Sheave.</i>                     |
| 16. <i>Body Side-bearing.</i>        | 45. <i>Corner-post pocket.</i>      | 79. <i>Freight-car Lock.</i>         | 138. <i>Drawbar Cross-timber.</i>  |
| 17. <i>Body Centre plate.</i>        | 46. <i>Plate.</i>                   | 80. <i>Card-raek.</i>                | 139. <i>Draw-gear Tie-rod.</i>     |
| 18. <i>King-bolt, or Centre-pin.</i> | 47. <i>Plate-rod.</i>               | 81. <i>Carline, or Curling.</i>      | 140. <i>Coupling-pin.</i>          |
| 19. <i>Body Truss-rod.</i>           | 48. <i>End-plate.</i>               | 82. <i>Main-carline.</i>             | 141. <i>Train Signal-lamp.</i>     |
| 20. <i>Body Truss-rod Saddle.</i>    | 49. <i>Girth.</i>                   | 83. <i>Purlin (see note to Figs.</i> | 142. <i>Brake-head.</i>            |
| 21. <i>Body Truss-rod Bearing.</i>   | 50. <i>End-girth.</i>               | <i>97-101).</i>                      | 143. <i>Brake-beam.</i>            |
| 22. <i>Needle-beam, or Cross-</i>    | 51. <i>End-girth Tie-rod.</i>       | 84. <i>Ridge-pole.</i>               | 144. <i>Brake-hanger.</i>          |
| <i>frame Tie-timber.</i>             | 52. <i>Sheathing, or Siding.</i>    | 85. <i>Roof-braces.</i>              | 145. <i>Brake-lever.</i>           |
| 23. <i>Drawbar.</i>                  | 53. <i>Inside-lining.</i>           | 86. <i>Roof-bocards.</i>             | 146. <i>Brake-lever Fulerum.</i>   |
| 24. <i>Draw-spring.</i>              | 54. <i>Lining-strips.</i>           | 87. <i>Running-board.</i>            | 147. <i>Brake lever Guide.</i>     |
| 25. <i>Auxiliary Buffer-spring.</i>  | 55. <i>Upper Corner-plate.</i>      | 88. <i>Running-board Exten-</i>      | 148. <i>Brake-lever Bracket</i>    |
| 26. <i>Draw-timbers.</i>             | 55' (Same as 57).                   | <i>sion.</i>                         | 150. <i>Brake-shaft Chain.</i>     |
| 27. <i>Floor.</i>                    | 56. <i>Middle Corner-plate.</i>     | 89. <i>Running-board Bracket.</i>    | 151. <i>Brake-shaft Connect-</i>   |
| 28. <i>Double Deck.</i>              | 57. <i>Lower Corner-plate.</i>      | 90. <i>Eaves-moulding.</i>           | <i>ing-rod.</i>                    |
| 29. <i>Buffer-block.</i>             | 58. <i>Pull-iron.</i>               | 91. <i>Eaves Fascia-board.</i>       | 152'. <i>Lower Brake-rod.</i>      |
| 30. <i>Sill-step.</i>                | 59. <i>Ladder-rounds.</i>           | 92. <i>Roof-step.</i>                | 165. <i>Journal-box.</i>           |
| 31. <i>Sill-step Stay.</i>           | 59'. <i>Bent Ladder-round.</i>      |                                      |                                    |

(Certain additions to this list, shown only in the special drawings referred to, are given with Figs. 95-96 (viz., Nos. 175 to 192, and No. 201); with Figs. 97-101 (viz., Nos. 202 to 209), and with Figs. 113-115 (viz., Nos. 194-200). Numbers omitted from the above list are used for names of parts special to other forms of freight cars than box cars, as per following lists.)



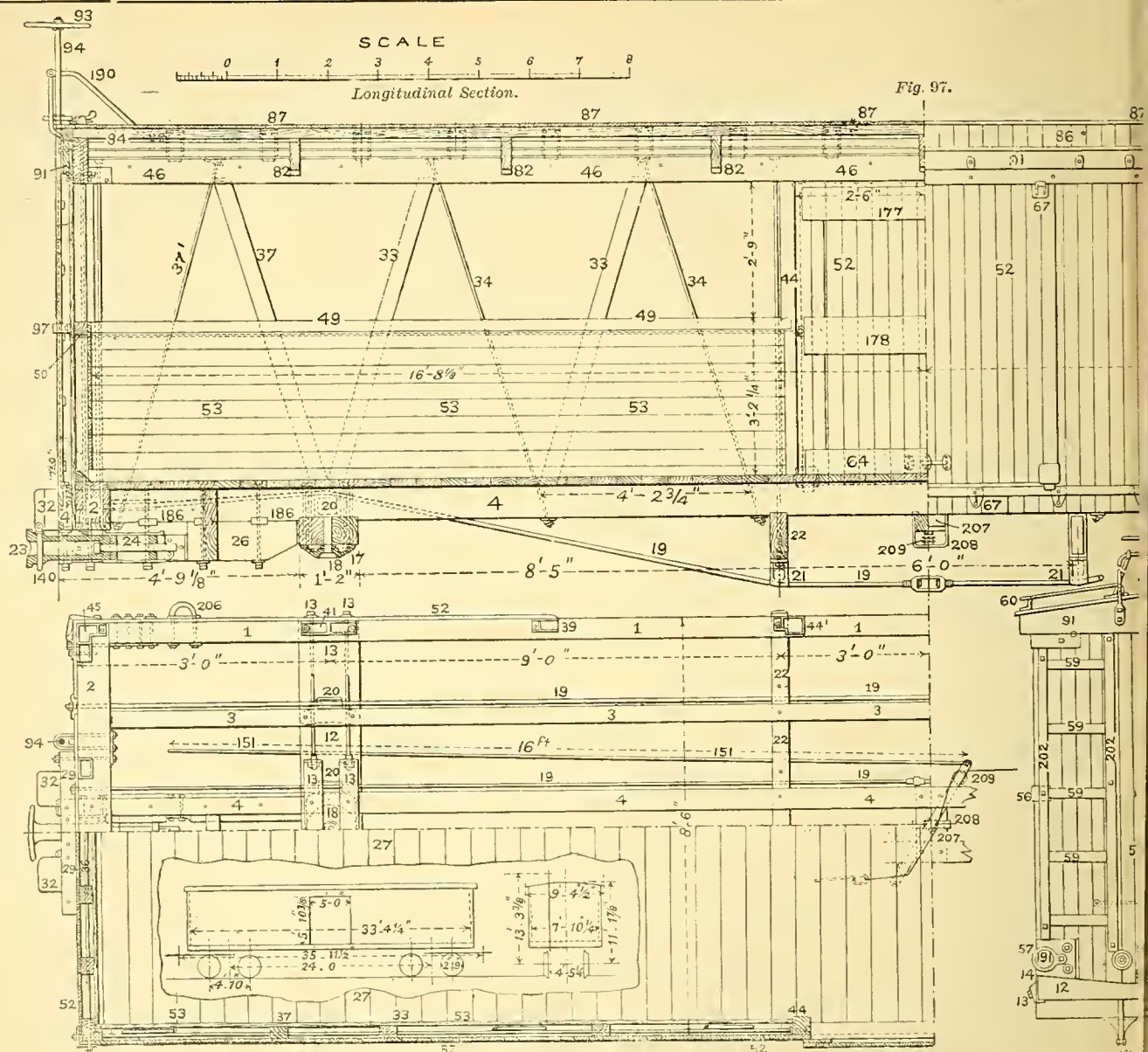
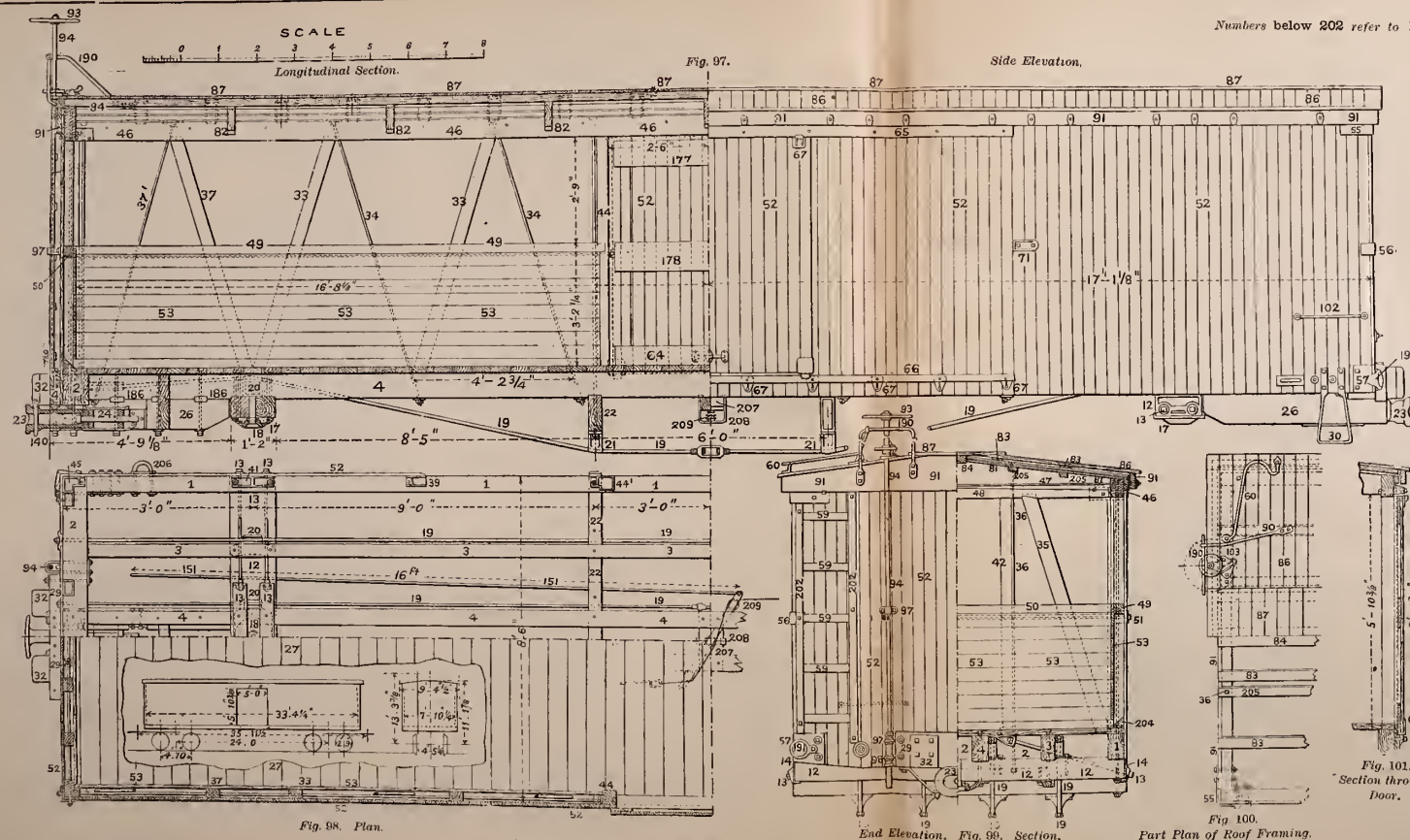


Fig. 98. Plan.









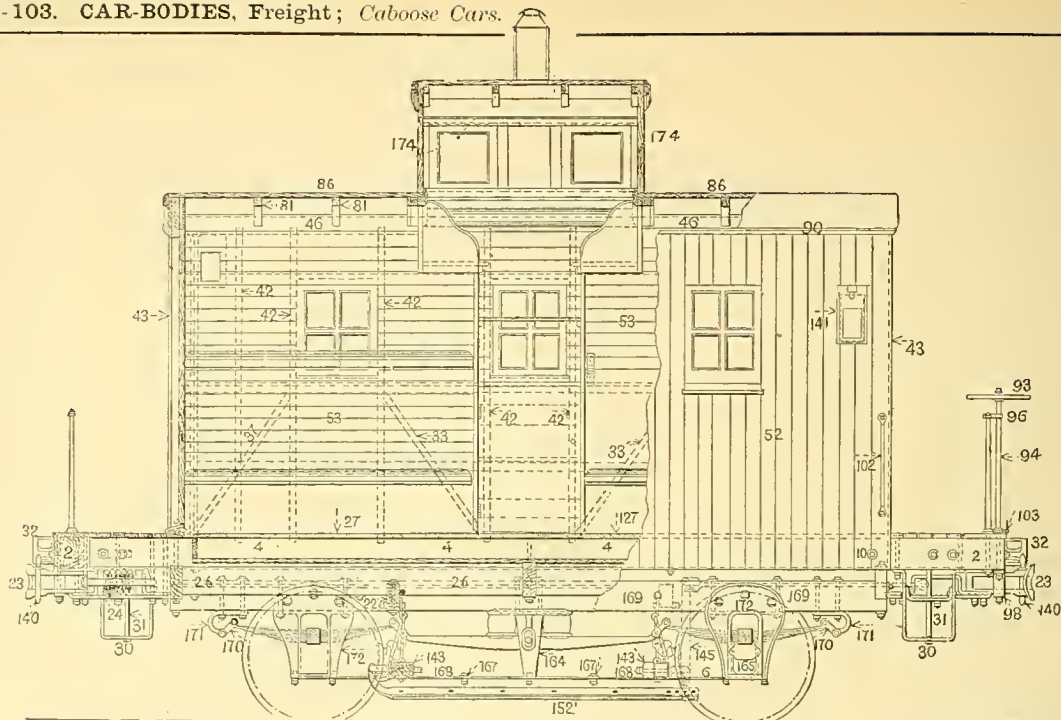
Numbers below 202 refer to List of Names of Parts on preceding page.

NAMES OF PARTS SPECIAL TO FIGS. 97-100  
IN ADDITION TO GENERAL LIST ON PRE-  
CEDING PAGE, FOR NUMBERS BELOW 202.

- 202. Ladder Side-rails.
- 203. Drawbar Strap.
- 204. Floor Blocking-strip.
- 205. Partins.\*
- 206. Pull-iron.
- 207. Brake-equalizer Block.
- 208. " Equalizer Strap.
- 209. " Equalizing-lever.

\* The numbers 83 and 205 are reversed in these engravings—205 are the Partins proper and 83, Roof strips.

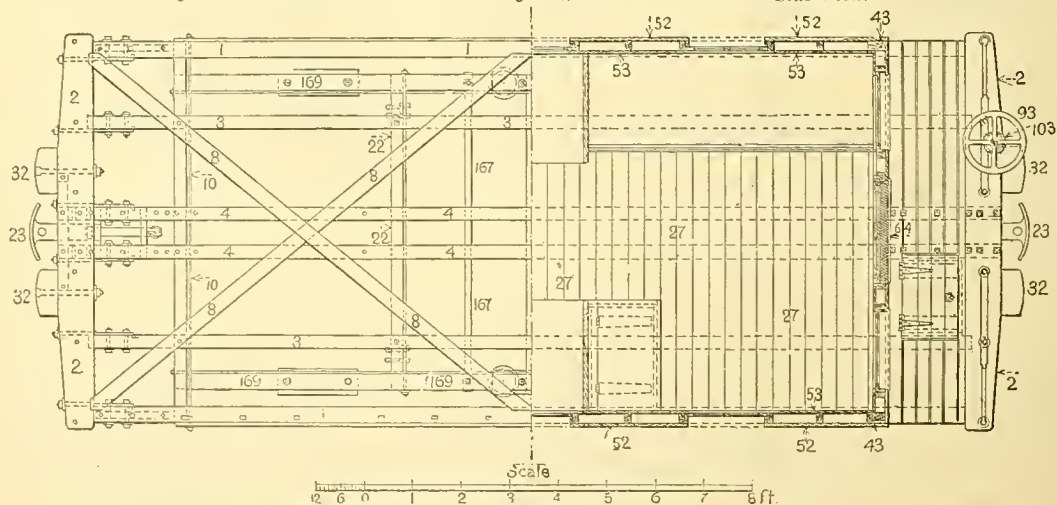




Longitudinal Section.

Fig. 102.

Side View.



Half Plan, showing Floor Framing.

Fig. 103.

Half Plan, showing Inside

FOUR-WHEELED CABOOSE CAR, with LOOKOUT, PENNSYLVANIA RAILROAD AND ALLIED LINES.  
(Old style. The present standard, modified from the above, is shown in Figs. 45-6-7.)

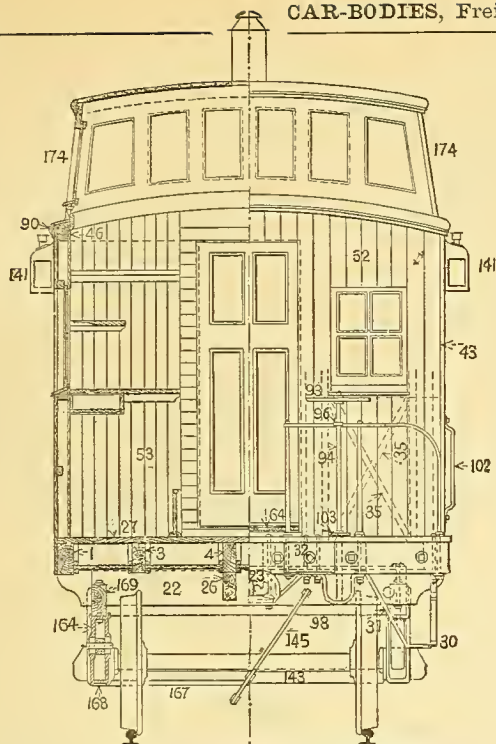


Fig. 104. Transverse Section. End View.

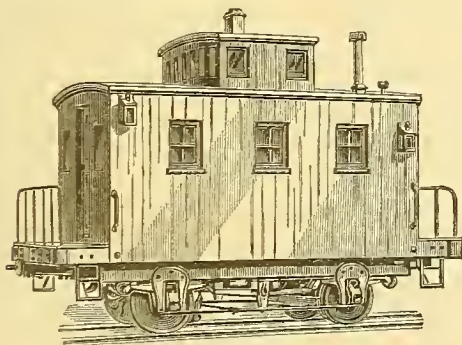


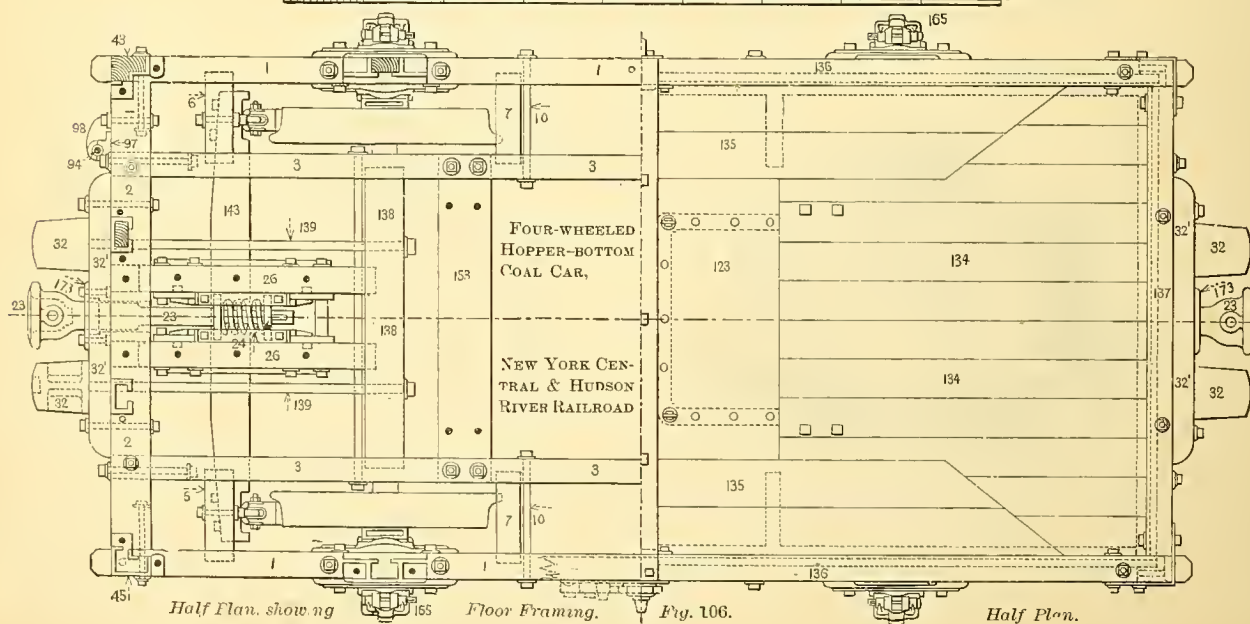
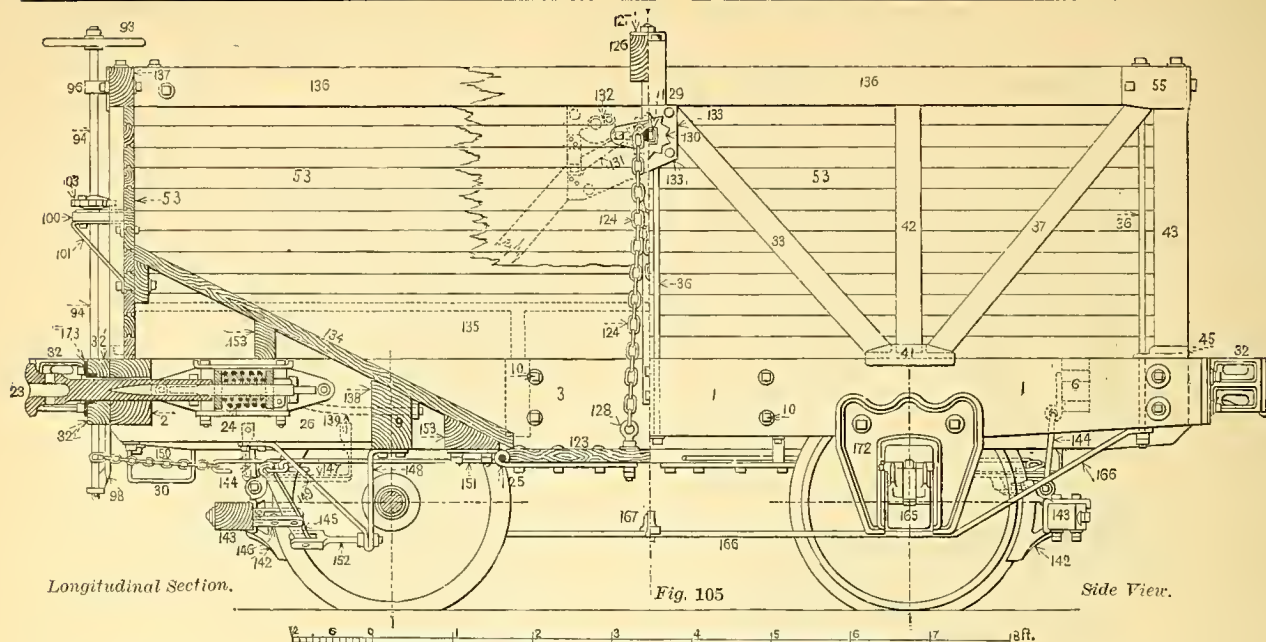
Fig. 104½. Perspective View.  
FOUR-WHEELED CABOOSE CAR, PENNSYLVANIA RAILROAD.  
(Old style; for new, see Figs. 45-47.)

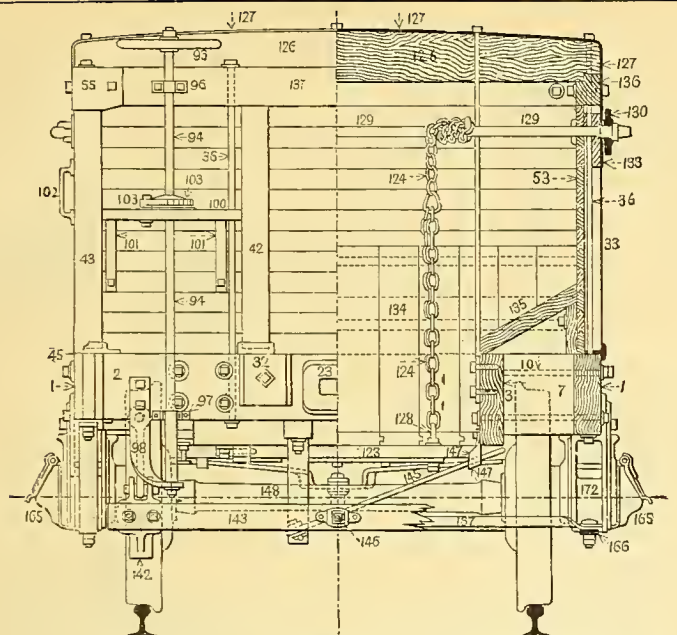
# NAMES OF PARTS; Figs. 102-104.

1. Side-sill.
2. End-sill.
3. Intermediate-sill.
4. Centre-sill.
5. Short Floor-timber.
6. Brake-hanger Timber.
8. Floor-timber Braces.
10. Sill Tie rod.
22. Needle-beam or Cross-frame Tie-timber.
23. Drawbar.
24. Draw-spring.
26. Draw timbers.
27. Floor.
30. Sill-step.
31. Sill-step Stay.
32. Dead-blocks.
33. Side Body-brace.
35. End Body-brace.
37. Body-counterbrace.
42. Body post.
43. Corner-post.
46. Plate.
52. Sheathing or Siding.
53. Inside-lining.
64. Door-sill.
81. Carline or Carling.
86. Roof-boards.
90. Eaves-moulding.
93. Brake-wheel.
94. Brake-shaft.
96. Upper Brake-shaft Bearing.
98. Brake-shaft Step.
102. Corner Grab-iron.
103. Brake Ratchet-wheel.
140. Coupling-pin.
141. Train Signal-lamp.
143. Brake-beam.
145. Brake-lever.
- 152'. Lower Brake-rod.
165. Journal-box.
167. Pedestal Stay-rod.
168. Pedestal Tie-bar.
169. Pedestal-timber.
170. Spring-hanger.
171. Spring-hanger Iron.
172. Pedestal.
174. Lookout.

(Parts numbered 8, 164, 170, 171 and 174 are special to this car, and appear nowhere else.)







End View.

Fig. 107.

Transverse Section.

FOUR-WHEELED HOPPER-BOTTOM COAL CAR, NEW YORK CENTRAL &amp; HUDSON RIVER RAILROAD.

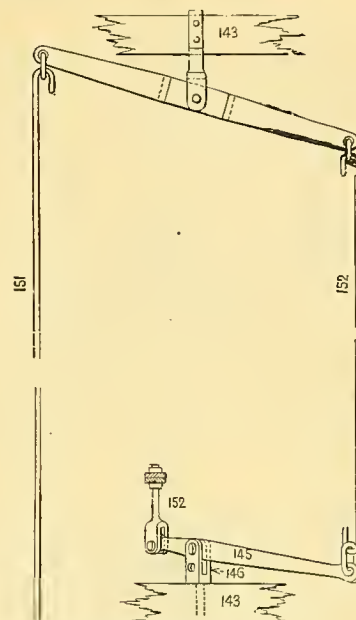


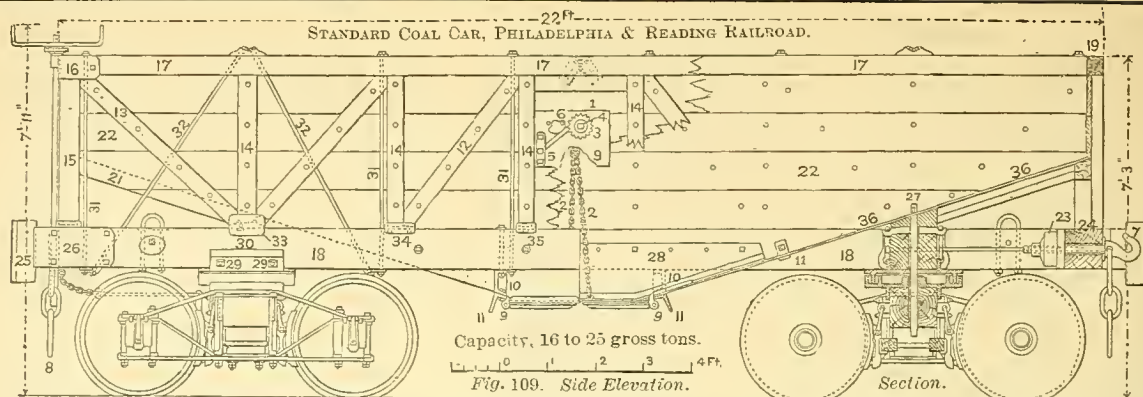
Fig. 108. Plan of Brake.

## NAMES OF PARTS, Figs. 105-108.

- |                                 |  |                                  |
|---------------------------------|--|----------------------------------|
| 1. Side-sill.                   | 55. Upper Corner-plate.                            | 133. Winding-shaft Plate.        |
| 2. End-sill.                    | 57. Lower Corner-plate.                            | 134. Inclined End-floor.         |
| 3. Intermediate Sill.           | 93. Brake-wheel.                                   | 135. Inclined Side-flooring.     |
| 5. Short Floor-timber.          | 94. Brake-shaft.                                   | 136. Top Side-rail.              |
| 6. Brake-hanger Timber.         | 96. Upper Brake-shaft Bearing.                     | 137. Top End-rail.               |
| 7. Floor-timber Distance-block. | 97. Lower Brake-shaft Bearing.                     | 138. Drawbar Cross-timber.       |
| 10. Sill Tie-rod.               | 98. Brake-shaft Step.                              | 139. Draw-gear Tie-rod.          |
| 23. Drawbar.                    | 100. Brake-step.                                   | 142. Brake-head.                 |
| 24. Draw-spring.                | 101. Brake-step Bracket.                           | 143. Brake-beam.                 |
| 26. Draw timbers.               | 102. Corner-handle.                                | 144. Brake-hanger.               |
| 30. Sill-step.                  | 103. Brake Ratchet-wheel.                          | 145. Brake-lever.                |
| 32. Dead-blocks.                | 123. Drop-doors.                                   | 146. Brake-lever Fulcrum.        |
| 32'. Buffer-beam.               | 124. Drop-door Chain.                              | 147. Brake-lever Guide.          |
| 33. Side Body-brace.            | 125. Drop-door Hinge.                              | 148. Brake-lever Bracket.        |
| 34. Side Body-brace Rod.        | 126. Drop-door Beam.                               | 149. Brake-lever-bracket Brace.  |
| 36. Sill-and-Plate Rod.         | 127. Strap, for Drop-door Beam.                    | 151. Brake-shaft Connecting-rod. |
| 37. Body-counterbrace.          | 128. Eye-bolt.                                     | 152. Secondary Brake-rod.        |
| 39. Brace-pocket.               | 129. Winding-shaft.                                | 153. Inclined Floor-timbers.     |
| 41. Double Brace-pocket.        | 130. Winding-shaft Ratchet-wheel.                  | 165. Journal-box.                |
| 42. Body-post.                  | 131. Pawl, for Winding-shaft Ratchet-wheel.        | 166. Pedestal Brace-tie Bar.     |
| 43. Corner-post.                | 132. Dog, for Pawl of Winding-shaft Ratchet-wheel. | 167. Pedestal Stay-rod.          |
| 45. Corner-post Pocket.         |  | 172. Pedestal.                   |
| 53. Inside-lining.              |  | 173. Drawbar Friction-plate.     |

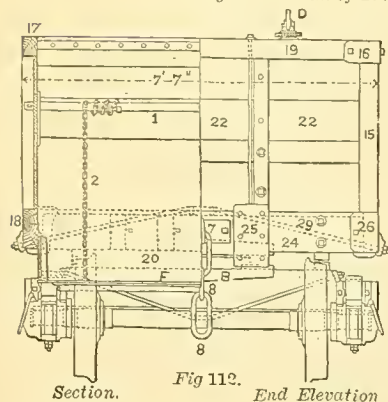
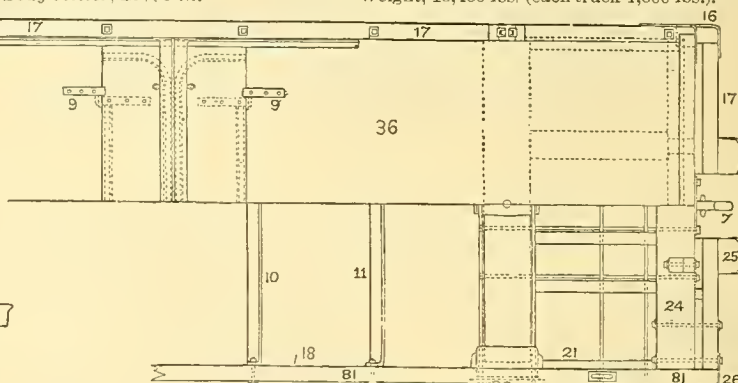
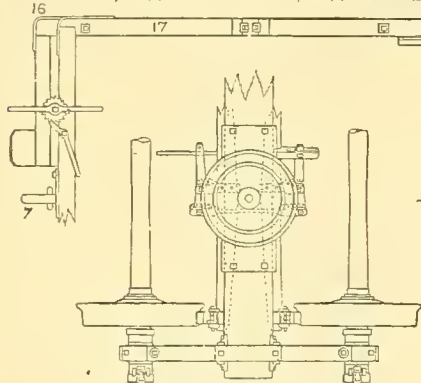
(Nos. 32, 123 to 137 inclusive, 149, 152, 153, 167 and 173 are parts special to this car, and do not appear elsewhere, except in part, by different numbers on the following page, as there noted.)





Side sills, 10 × 4 in. End sills, 10 × 10 in. Body bolster, 12 × 9 in.

Weight, 18,480 lbs. (each truck 4,800 lbs.).



### NAMES OF PARTS, Figs. 109-112.

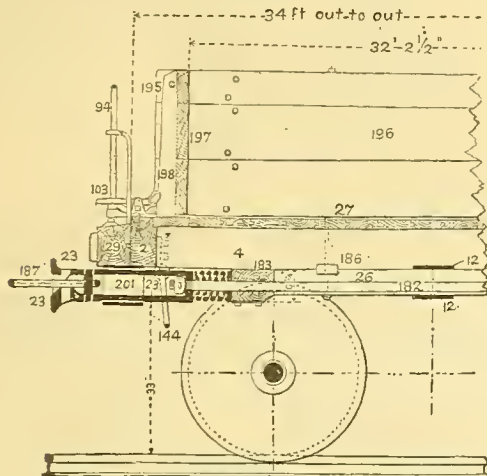
(Numbers in parentheses refer to the list of corresponding parts on the previous page, Figs. 105-108.)

- |   |   |
|---|---|
| 1 (133). Winding-shaft Plate.                           | 11. Inclined-floor Cross-bar.   |
| 2 (124). Drop-door Chain, or Hopper-chain.              | 12 (33). Side Body-brace.   |
| 3 (130). Winding-shaft Ratchet-wheel.                   | 13 (37). Body Counter-brace.  |
| 4 (129). Winding-shaft, with Winding-arbor, Square-end. | 14 (42). Body-post.   |
| 5 (131). Pawl for Winding-shaft Ratchet.                | 15 (43). Corner-post.   |
| 6 (132). Dog for Pawl of Winding-shaft.                 | 16 (55). Upper Corner-plate.  |
| 7. Draw-hook.   | 17 (136). Top Side-rail.  |
| 8. Coupling-chain, or Triple Coupling-link.             | 18 (1). Sill or Side-sill.  |
| 9 (125). Drop-door Hinge.                               | 19 (137). Top End-rail.   |
| 10. Hopper Transom.                                     | 20 (same as 36). Inclined Floor (if wood), or Inclined Hopper-plates (if iron). |
|   | 21. Inclined Floor-timbers.   |
|   | 22 (53). Inside Lining.   |

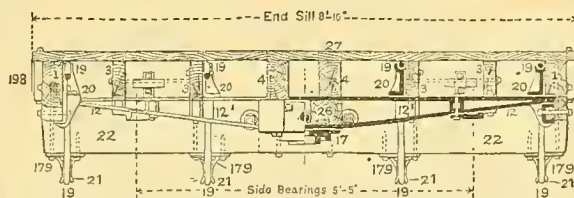
(CONTINUED ON FOLLOWING PAGE.)

(LIST CONTINUED FROM PREVIOUS PAGE.)

- |   |   |
|---|---|
| 23 (24). <i>Draw-spring.</i>              | 31 (36). <i>Sill and Plate Rods.</i>    |
| 24 (2). <i>End-sill.</i>                  | 32 (34). <i>Side Body-brace Rod.</i>    |
| 25 (32). <i>Dead-blocks.</i>              | 33 (41). <i>Double Brace-pocket.</i>    |
| 26 (57). <i>Lower Corner-plate.</i>       | 34 (39). <i>Brace Pocket.</i>           |
| 27. <i>Centre-pin or King-bolt.</i>       | (No number.) <i>Corner-post Pocket.</i> |
| 28. <i>Side Hopper-plates.</i>            | 35. <i>Body-post Pocket.</i>            |
| 29. <i>Body-bolster Truss-rods.</i>       | 36 (134). <i>See 20.</i>                |
| 30. <i>Body-bolster Truss-rod Washer.</i> | <b>B. Truck Center-plates.</b>          |
|   | <b>F (123). Drop-door.</b>              |



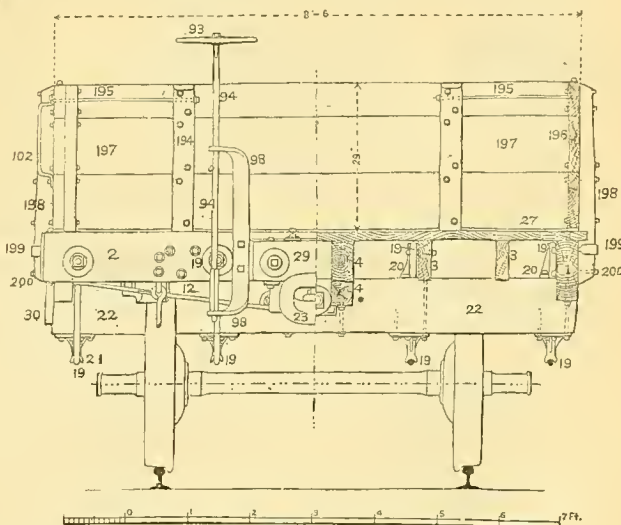
*Fig. 113. Longitudinal Section.*



*Fig. 114.*

*Section through Draw-spring.*

*Section through Bolster.*



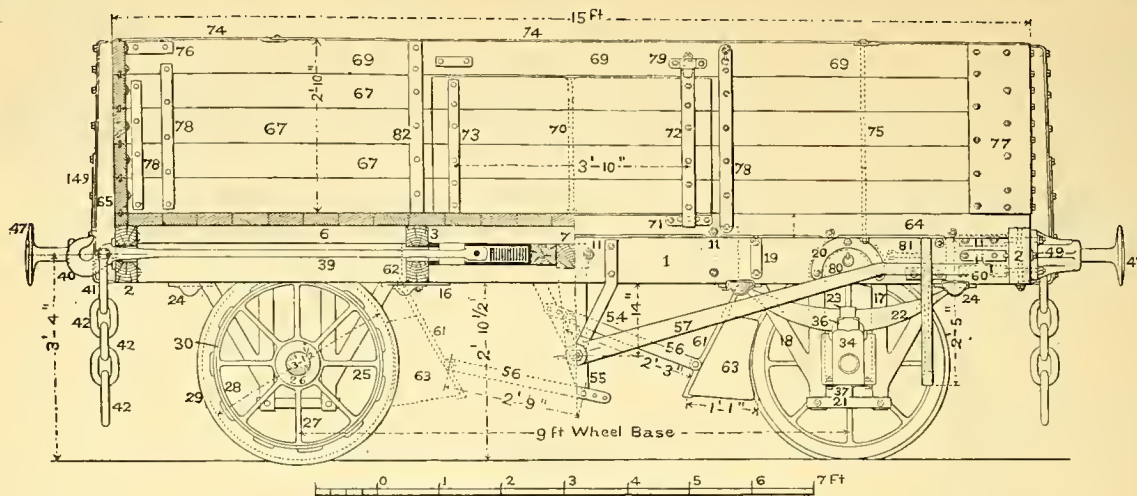
*End Elevation. Fig. 115. Section through Centre of Car.*

STANDARD GONDOLA OR PLATFORM CAR, NEW YORK CENTRAL & HUDSON RIVER RAILROAD,  
with HOIT DRAW-GEAR (shown separately in Figs. 426-427.)

NAMES OF PARTS OF GONDOLA CAR: *Figs. 113-115.*

- |                                     |                                   |                                   |                                 |
|-------------------------------------|-----------------------------------|-----------------------------------|---------------------------------|
| 1. <i>Side-sill.</i>                | 21. <i>Body Truss-rod Bearing</i> | 93. <i>Brake-wheel.</i>           | 187. <i>Link.</i>               |
| 2. <i>End-sill.</i>                 | on <i>Queen-post.</i>             | 94. <i>Brake-shaft.</i>           | 194. <i>Side-straps.</i>        |
| 3. <i>Intermediate-sill.</i>        | 22. <i>Needle-beam or Cross-</i>  | 98. <i>Brake-shaft Step.</i>      | 195. <i>Side-strap Tie-rod.</i> |
| 4. <i>Centre-sill.</i>              | frame <i>Tie-timber.</i>          | 103. <i>Brake Ratchet-wheel.</i>  | 196. <i>Side-plank.</i>         |
| 12. <i>Body-bolster.</i>            | 23. <i>Drawbar.</i>               | 144. <i>Brake-hanger.</i>         | 197. <i>End-plank.</i>          |
| 12'. <i>Body - bolster Spacing-</i> | 24. <i>Draw-spring.</i>           | 179. <i>Queen-post.</i>           | 198. <i>Stake.</i>              |
| block.                              | 26. <i>Draw-timbers.</i>          | 182. <i>Draw-rod.</i>             | 199. <i>Stake-pocket Strap.</i> |
| 19. <i>Body Truss-rod.</i>          | 27. <i>Floor.</i>                 | 183. <i>Follower-plate Block.</i> | 200. <i>Stake-bolt.</i>         |
| 20. <i>Body Truss rod Saddle.</i>   | 29. <i>Buffer-block.</i>          | 186. <i>Packing-blocks.</i>       | 201. <i>Drawbar Carry-iron.</i> |
|                                     | 30. <i>Sill-step.</i>             |                                   |                                 |





*Fig. 116. Section and Elevation.*

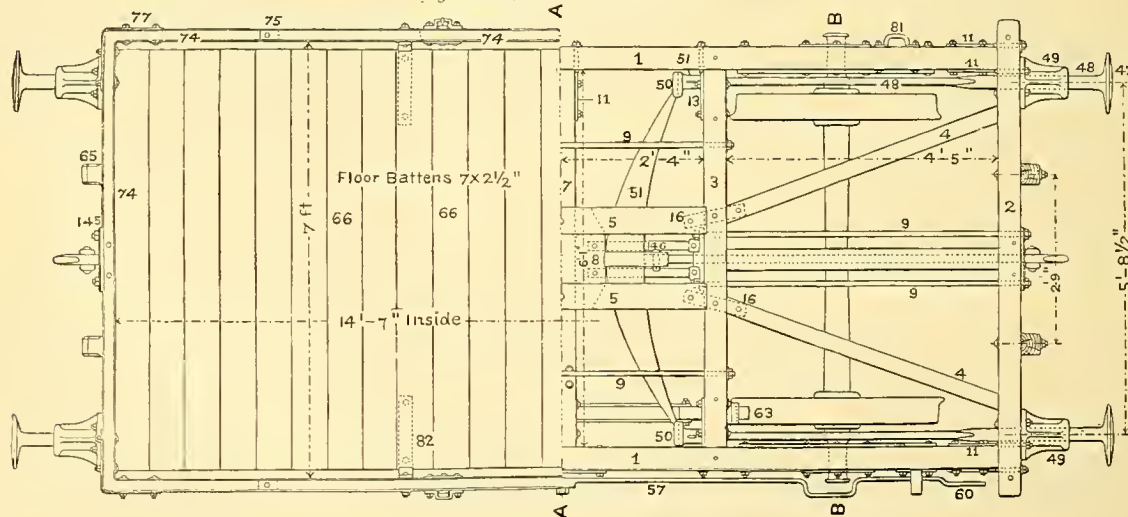


Fig. 117. Plan, showing Framing

ENGLISH OPEN "GOODS WAGON."

Average weight 10,700 lbs. Maximum capacity, 18,000 lbs

GENERAL CLASSIFICATION OF LIST OF PARTS ON FOLLOWING PAGE.

1-21. *Underframe.*  
22-38. *Running-gear.*

39-52, and 145, 146. *Buffing and Draw-gear.* | 64-78. *Body.*  
53-63. *Brake-gear, or Brake-work.* |

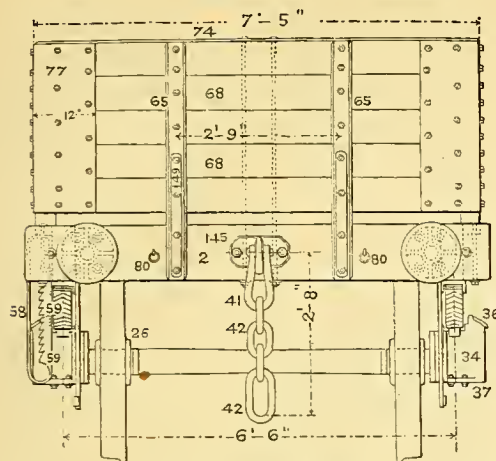
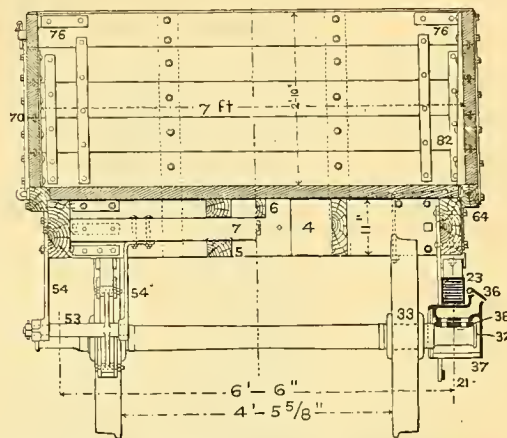


Fig. 118. End Elevation.



Section through Centre. Fig. 119. Section through Axle.

## NAMES OF PARTS OF ENGLISH "GOODS WAGON," Figs. 116-119.

- |  |  |  |   |
|--|--|--|---|
| 1. Solebar.                                      | 26. Boss, or Nave.   | 52. Auxiliary Draw-spring (Rubber).                                    | 68. End Board, or End Sheeting.   |
| 2. Headstock, or Buffer Beam.                    | 27. Spoke.   | 53. Brake-shaft, or Weigh-bar.   | 69. Continuous Topside.   |
| 3. Cross bearer, Cross-bar, or Transome.         | 28. Rim.   | 54. Brake-shaft Hanger (V pattern).                                    | 70. Falling Door, or Flap Door.   |
| 4. Diagonal.                                     | 29. Tire.  | 54'. Brake-shaft Hanger (Plate pattern).                               | 71. Strap Hinge, or Door-hinge Joint.   |
| 5. Middle longitudinal.                          | 26. 27 and 28. Wheel-Centre, or Skeleton.  | 55. Brake-shaft Arm, or Brake Louble-lever.                            | 72. Hinge-plate, or Door-hinge.   |
| 6. End Half-longitudinal.                        | 30. Key-ring Tire-Fastening.   | 56. Brake-rod, or Brake Push-rod.                                      | 73. Hinge-plate Washer, or Door-hinge Washer-plate.                             |
| 7. Brake-shaft Cross-bearer, or Centre Crossbar. | 31. Journal.   | 57. Brake-lever, or Long Brake-lever.                                  | 74. Coping, or Capping-iron.  |
| 8. Buffing-spring Bed, or Back Chock.            | 32. Collar of Journal.   | 58. Brake-lever Guard.   | 75. Through Body-bolt.  |
| 9. Longitudinal Tie-rod.                         | 33. Wheel-seat.  | 59. Brake lever Ratchet. (58 and 59 are also termed Brake-lever Rack.) | 76. Inside Body Corner-knee.  |
| 10. Transverse Tie-rod.                          | 34. Grease Axle-box.   | 60. Brake-lever Handle.  | 77. Outside Corner-plate.   |
| 11. Strap Bolt.                                  | 35. Grease-Chamber.  | 61. Brake-hanger, or Brake-block Hanger.                               | 78. Strap Washer, or Washer-plate.  |
| 16. Spider-plate (plain), or Underframe Plate.   | 36. Axle-box Cover, or Lid.  | 62. Brake-hanger Bracket.  | 79. Falling-door Latch, consisting of Door Fastening, Staple, Cotter and Chain. |
| 17. Axle guard Crown.                            | 37. Axle-box Keep.   | 63. Brake-block (wood).  | 80. Sheet-ring and Staple.  |
| 18. Axle-guard Wing.                             | 38. Axle-box Bearing, or Brass.  | 64. Crib-rail, Rocker-rail, or Side rail.                              | 81. Horse-hook, or Towing-Hook.   |
| 17 and 18. Axle-guard, "W" pattern.              | 39. Drawbar.   | 65. End Stanchion, or End Muntin.                                      | 82. Body Knee.  |
| 19. Axle-guard Wing-washer.                      | 40. Draw-hook.   | 66. Floor-Board, or Floor Batten.                                      | 145. Draw-hook Washer, or Drawbar Front-plate.                                  |
| 20. Axle-guard Crown-washer.                     | 41. Coupling-shackle.  | 67. Side Board, or Side Sheeting.                                      | 146. Draw-spring Cradle-plate.  |
| 21. Axle-guard Keep, Horn-stay, or Bridle.       | 42. Coupling-link.   |  |   |
| 22. Bearing-spring.                              | 41 and 42. Wagon-coupling, or Draw-chain, consisting of Shackle, Shackle-pin, and Links. |  |   |
| 23. Bearing-spring Buckle, or Hoop.              | 47. Buffer-head.   |  |   |
| 24. Bearing spring Shoe.                         | 48. Buffer-rod.  |  |   |
| 25. Wheel (Solid Wrought-iron Single-spoke).     | 49. Buffer-rod Guide, or Buffer-Block.   |  |   |
|  | 50. Buffer-rod Shoe.   |  |   |
|  | 51. Plate or Laminated Buffering and Draw-spring.  |  |   |



FRUIT CAR,  
CENTRAL PACIFIC RAIL-  
ROAD AND ALLIED  
LINES.  
(With Miller Draw-  
gear, End Ventilators  
and Double Doors.)

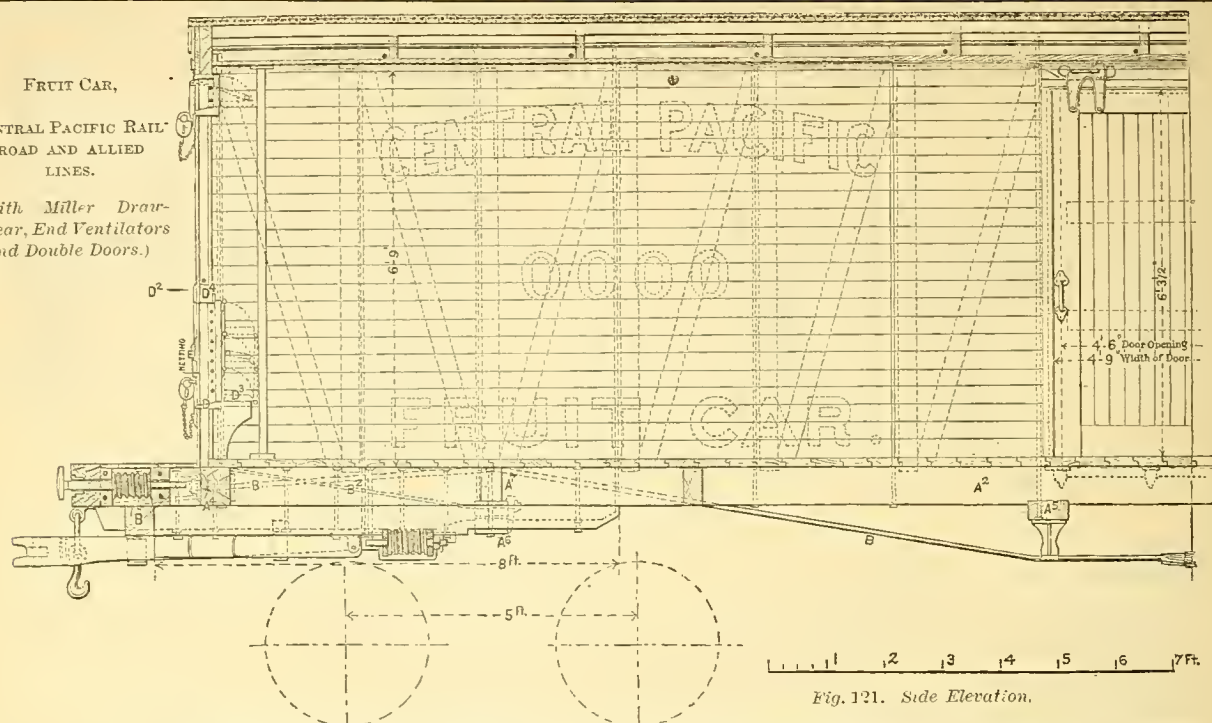


Fig. 121. Side Elevation.

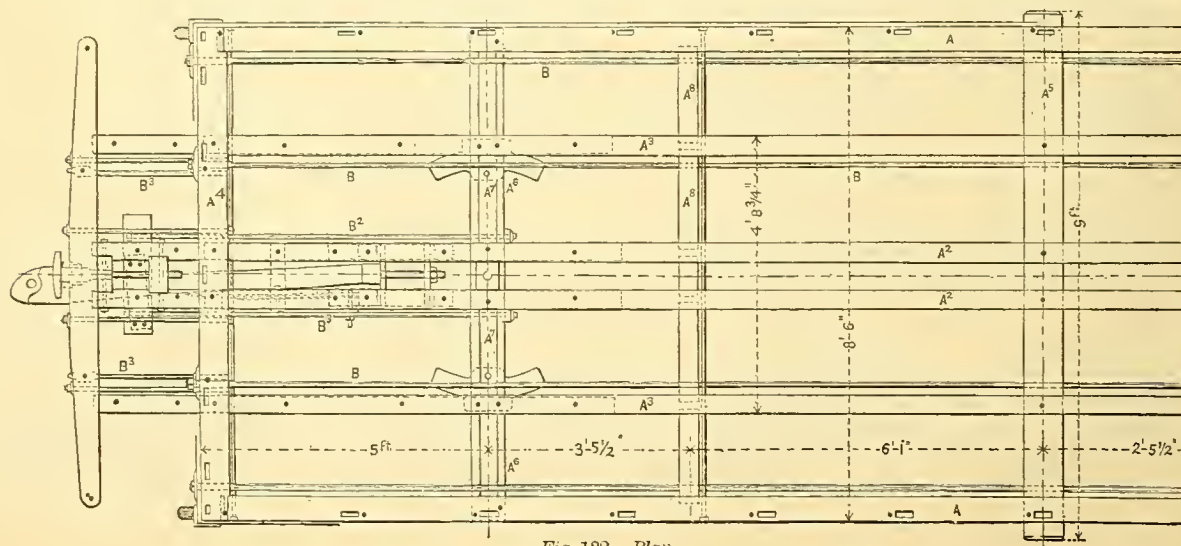
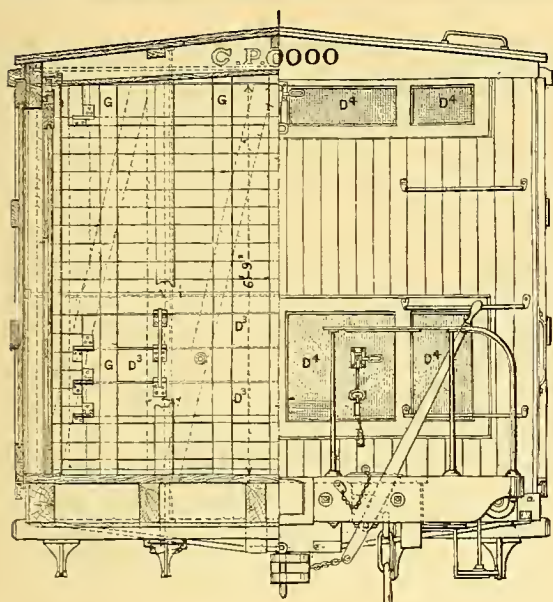


Fig. 122. Plan.



Section.

Fig. 123.

End Elevation.

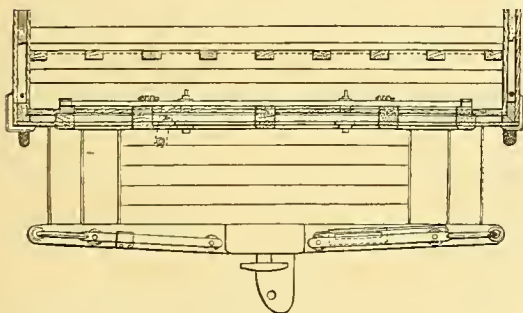


Fig. 124.

Plan of Floor and Platform, showing interior Guard-posts.

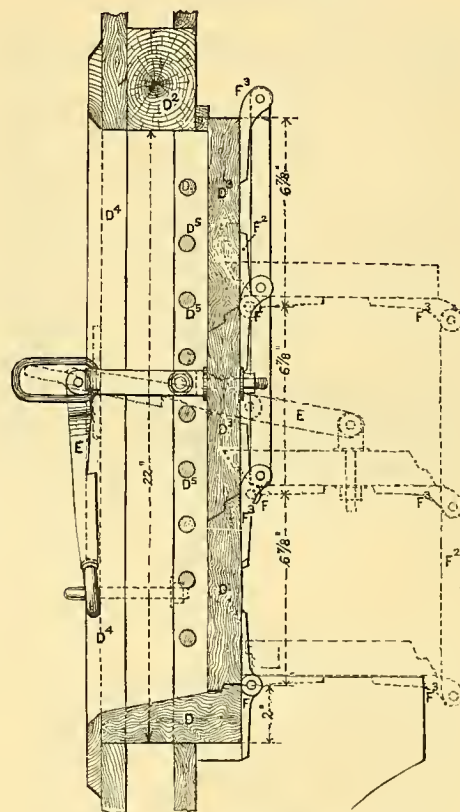


Fig. 125.

Enlarged Section through Lower Ventilator.

## NAMES OF PARTS, Figs. 121-125.

A. Side-sill.	A⁶. Body-bolster.	B³. Coupling-hook rod.	E. Ventilator Latch.
A². Centre-sill.	A⁷. Bolster Distance-block.	D. Ventilator-sill.	F. Ventilator Hinge.
A³. Intermediate-sill.	A⁸. Floor-timber Distance-block.	D². Ventilator Cap.	F². Ventilator Connecting-link.
A⁴. End-sill.	B. Truss-rod.	D³. Ventilator.	F³. Ventilator Pivot-pin.
A⁵. Needle-beam or Cross-frame Tie-timber.	B². Draw-rod.	D⁴. Ventilator Grating.	G. Guard-posts.



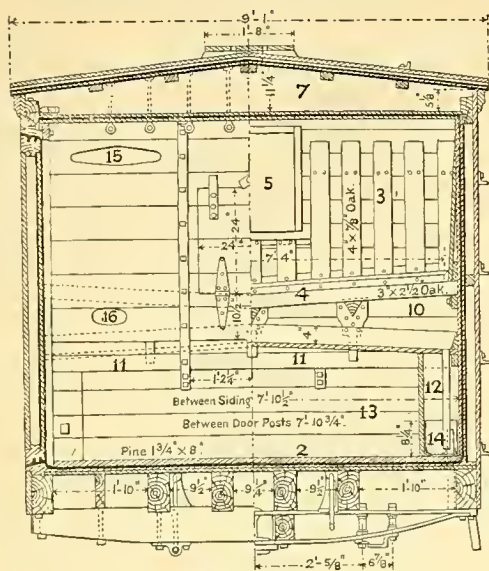
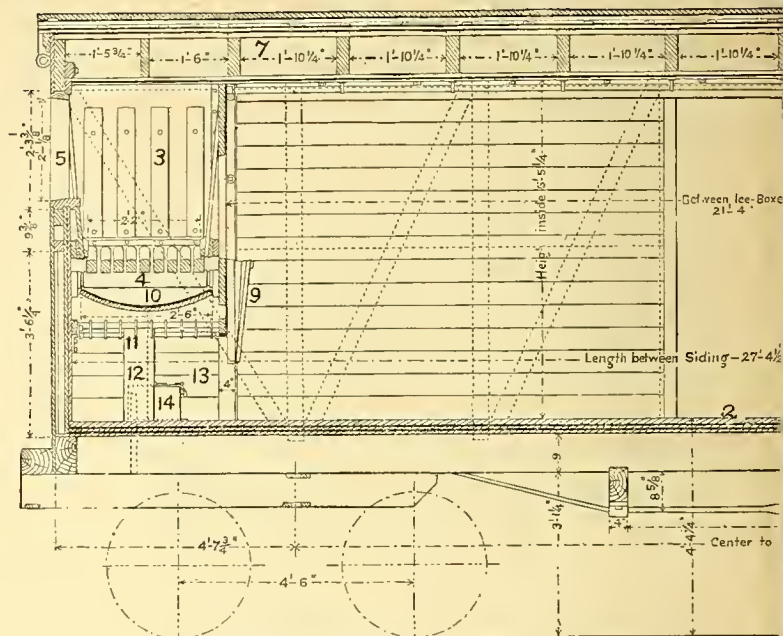


Fig. 126. End Section.

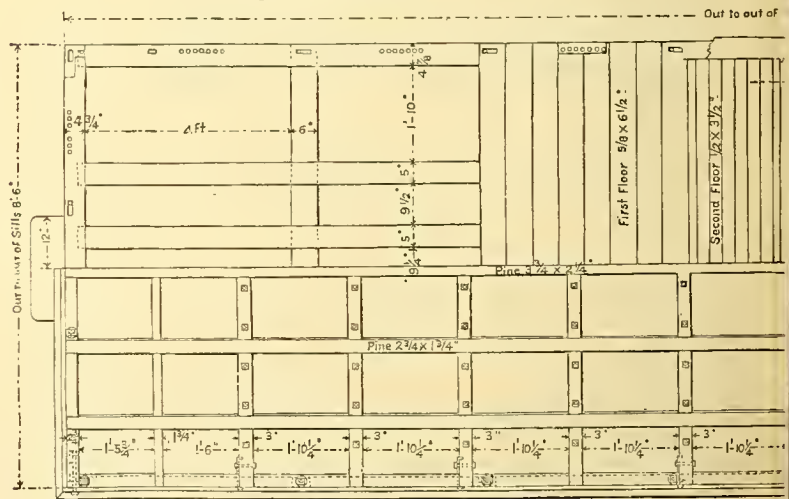


Longitudinal Section.

Fig.

## NAMES OF PARTS, Figs. 126-129.

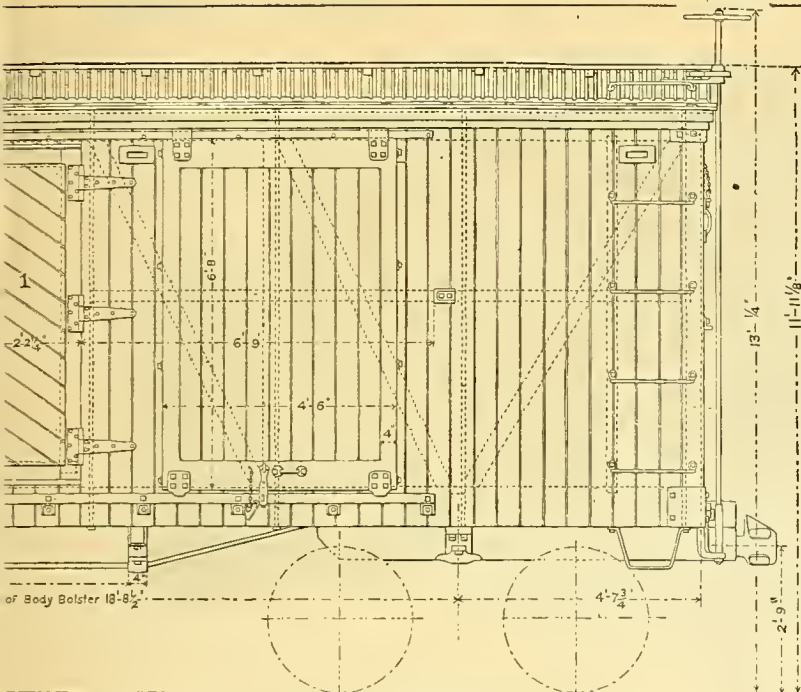
1. Inside-door.
2. Double-floor.
3. Ice-box.
4. Ice box Grating.
5. Ice-door (outside).
6. Grating Cleats.
7. Air-space.
8. Ice-door (inside).
9. Ventilator.
10. Ice-box Bottom.
11. Lower Grating.
12. Drip-pipe, or Drain.
13. Air-space.
14. Trap.
15. Upper Air hole.
16. Lower Air-hole.



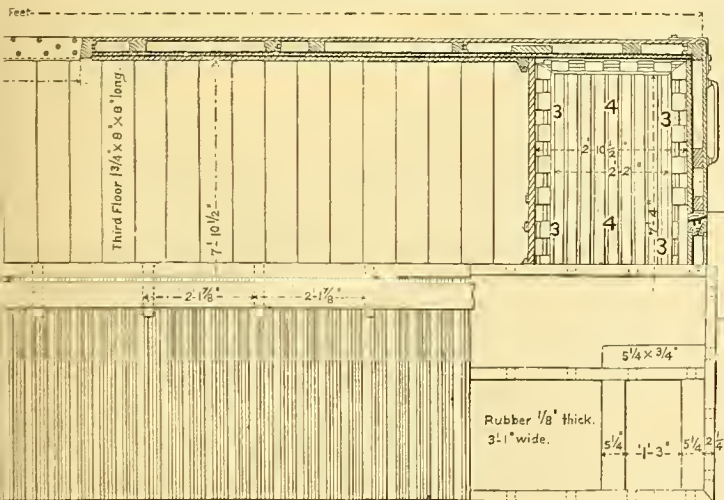
Floor.

Fig.

AYER "RUBBER"

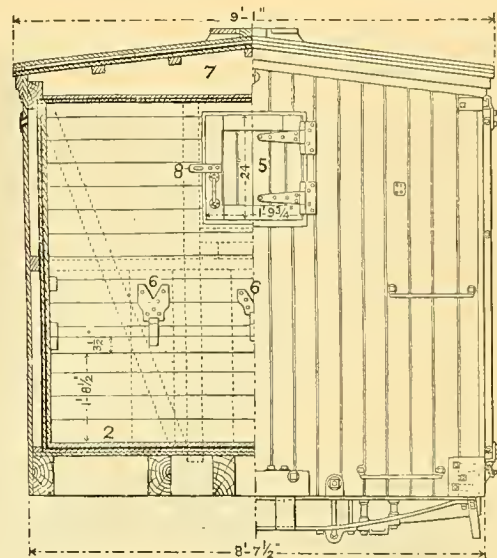


Side Elevation.



Plan of Roof.

Roof Framing.



Section.

Fig. 129.

End Elevation.

## AYER'S "RUBBER" REFRIGERATOR CAR.

Average weight.....	23,000 lbs.
Cost (1884) double-lined.....	\$750@ \$800
"    "    single-lined.....	650@ 700
Linings, double.....	200@ 225
"    single.....	125@ 150

SCALE.







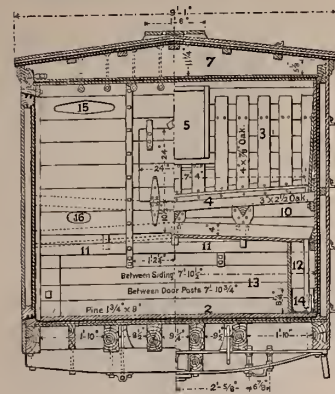
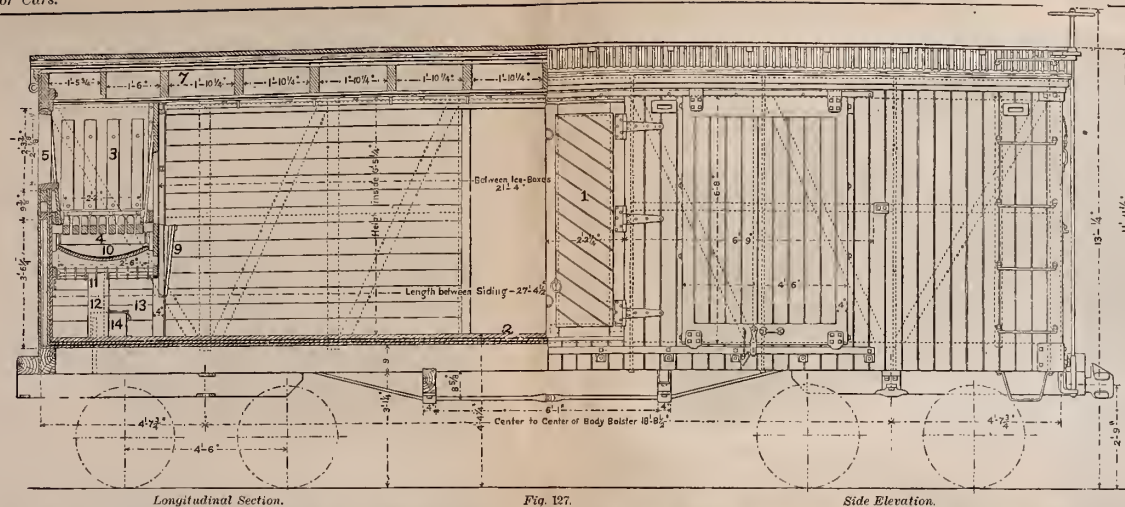


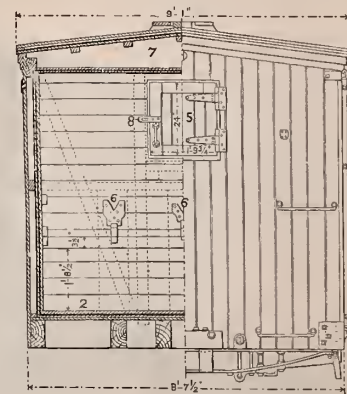
Fig. 126. End Section.



Longitudinal Section.

Fig. 127.

Side Elevation.



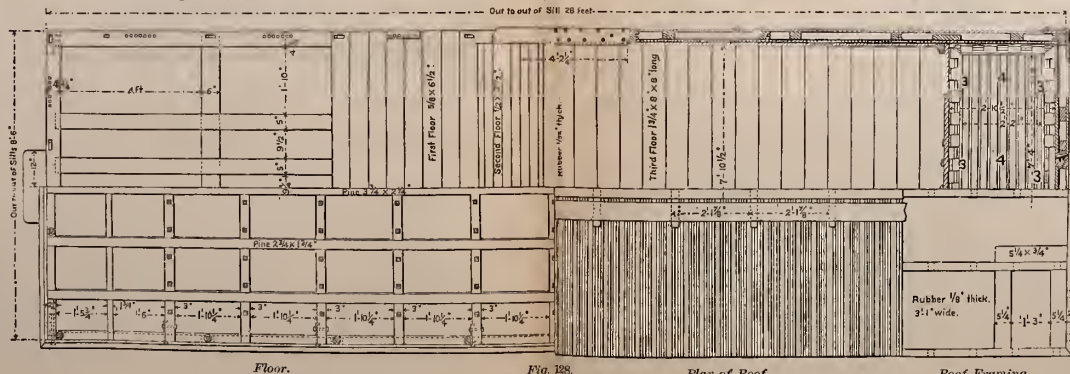
Section.

Fig. 128.

End Elevation

## NAMES OF PARTS, Figs. 126-129.

1. Inside-door.
2. Double-floor.
3. Ice box.
4. Ice box Grating.
5. Ice-door (outside).
6. Grating Cleats.
7. Air-space.
8. Ice-door (inside).
9. Ventilator.
10. Ice box Bottom.
11. Lower Grating.
12. Drip pipe, or Drain.
13. Air-space.
14. Trap.
15. Upper Air hole.
16. Lower Air-hole.



Floor.

Fig. 128.  
AYER "RUBBER" REFRIGERATOR CAR.

Plan of Roof.

Roof Framing.

SCALE.



## AYER "RUBBER" REFRIGERATOR CAR.

Average weight.....	23,000 lbs.
Cost (1884) double-lined.....	\$750@800
"    single-lined.....	650@ 700
Linings, double.....	200@ 225
"    single.....	125@ 150



NAMES OF PARTS, TIFFANY REFRIGERATOR  
CAR: Fig. 130a.

1. Ice-pan Gutter.
2. Conductor leading to Drip-pan under car.
3. Hanging-bars.
4. Ice-pan.
5. Air-space.

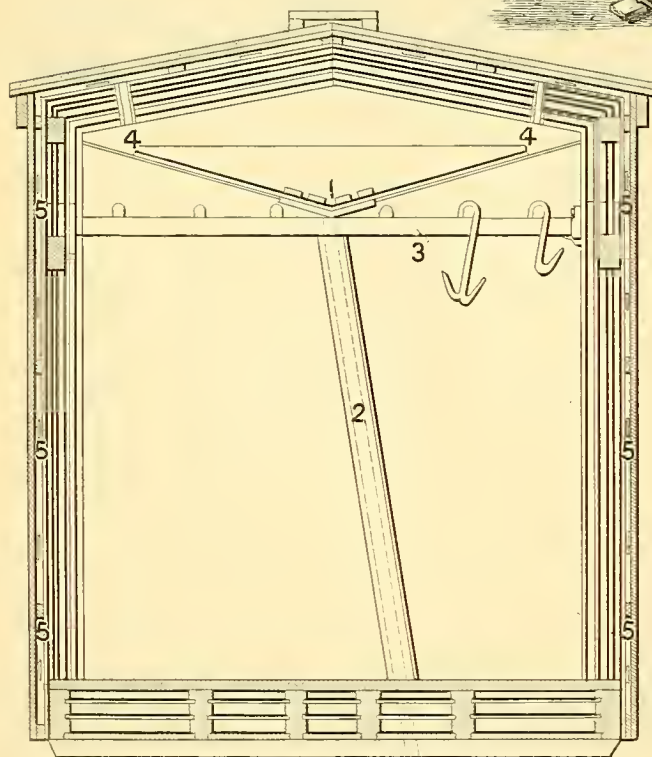


Fig. 130a. TIFFANY REFRIGERATOR CAR.

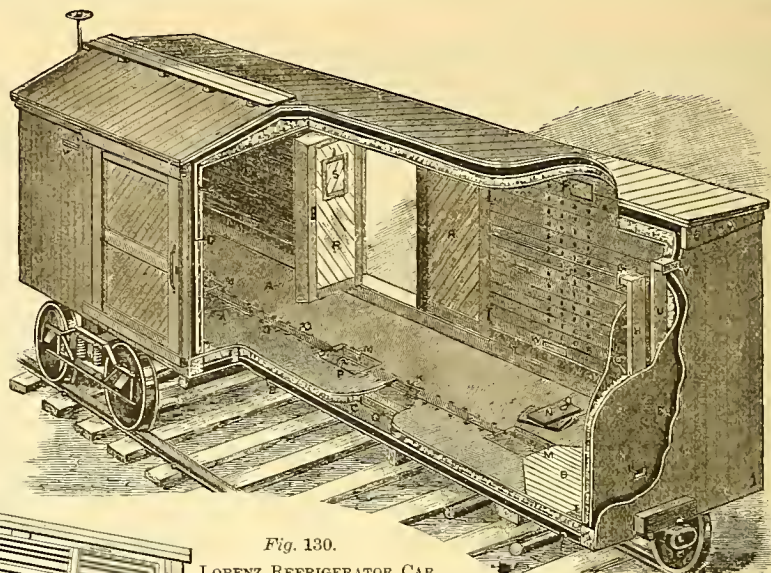


Fig. 130.  
LORENZ REFRIGERATOR CAR.

NAMES OF PARTS, LORENZ REFRIGERATOR CAR: Figs.  
130-130½.

- A, B. Floor (inclining to centre).
- C. Cork Wall.
- D. Air-space.
- E. Air-inlets.
- F. Floor Air inlets.
- G. Outlet Strainer.
- H. Air Outlet-pipe.
- I. Outlet-pipe Discharge.
- J. Interior Air holes.
- K. Trough.
- L. Cover-strip over Through slot.
- M. Floor Traps.
- N. Trap-doors.
- O. Draining-notches.
- P. Drain-pipe.
- Q. Centre-sills.
- R. Double Doors.
- S. Sub-door.
- T. Flashing (sheet metal)
- U. Air-inlet Pipe.
- V. Outer Inlet-strainer.
- W. Inside Inlet-strainer.

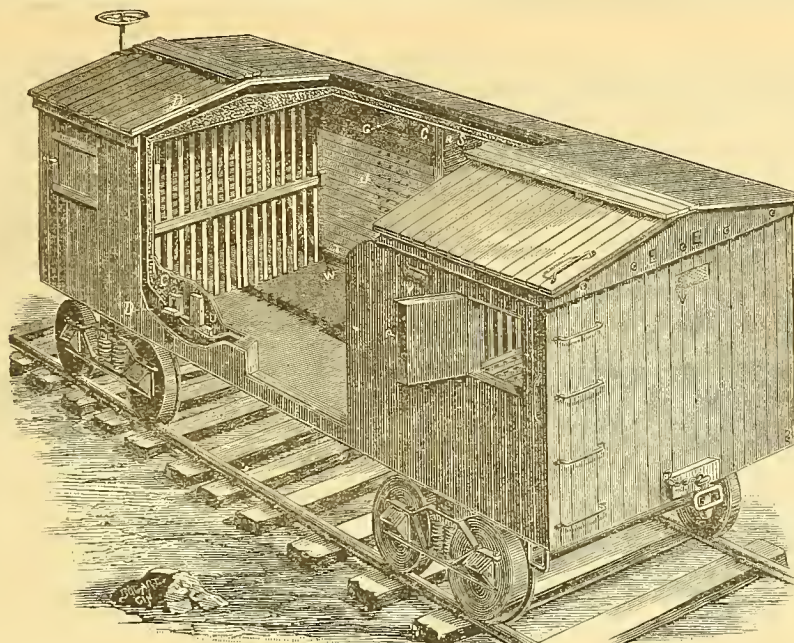


Fig. 130½.

LORENZ REFRIGERATOR CAR, showing ICE-RACK (about 30 in. wide) and ICE-DOORS.

(In the above figure the air inlet pipe *U* terminates in a continuous conduit passing around the bottom of the car behind the inside lining, instead of discharging directly into the car, as in Fig. 130.)

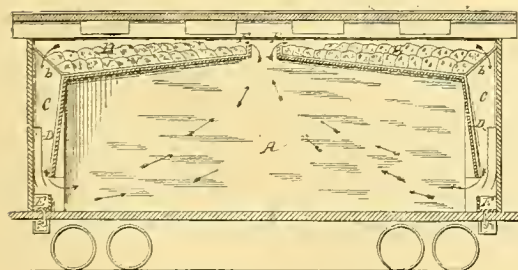


Fig. 131. Longitudinal Section.

ELY, CLOUD & WALL REFRIGERATOR CAR.

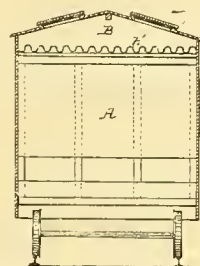
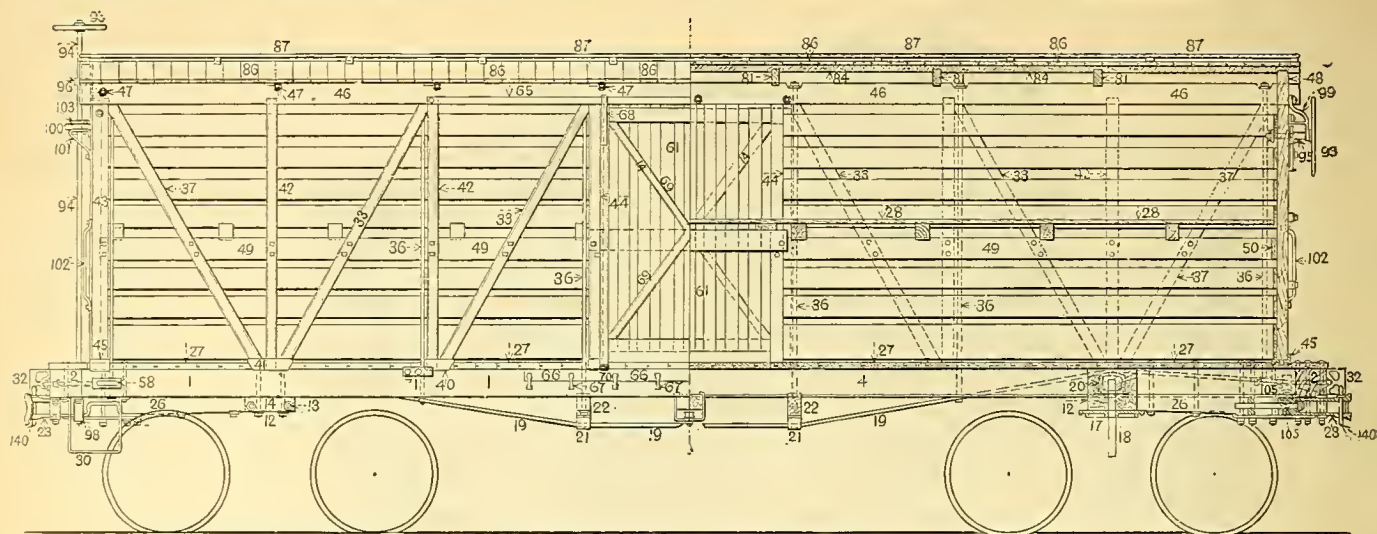


Fig. 131½. End Section.

NAMES OF PARTS, Figs. 131-131½.

- A. Refrigerator.
- B. Ice-box.
- C. Air-flue.
- D. Condensing Diaphragms.
- E. Drip-dish and Trap.
- F. Air-holes.
- b. Ice-box Grating.
- h'. Ice-box Bottom.

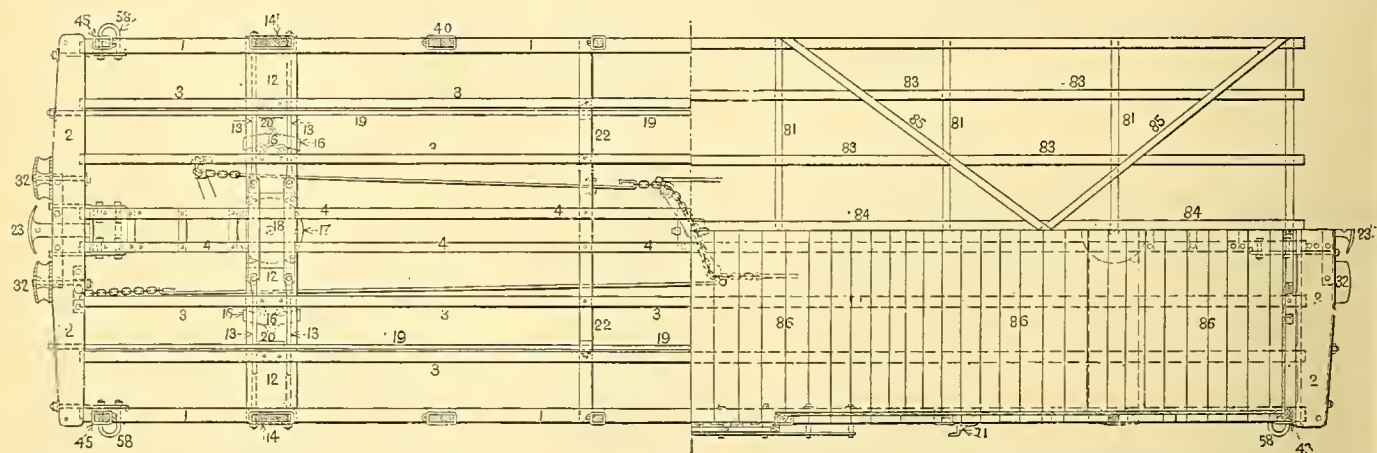




Side View.

Fig. 132.

Longitudinal Section.



Half Plan, showing Floor Framing.

Fig. 133.

Half Plan, showing Roof.

DOUBLE-DECK STOCK CAR, PENNSYLVANIA RAILROAD.  
(Old standard; for new, see Figs. 136-138.)

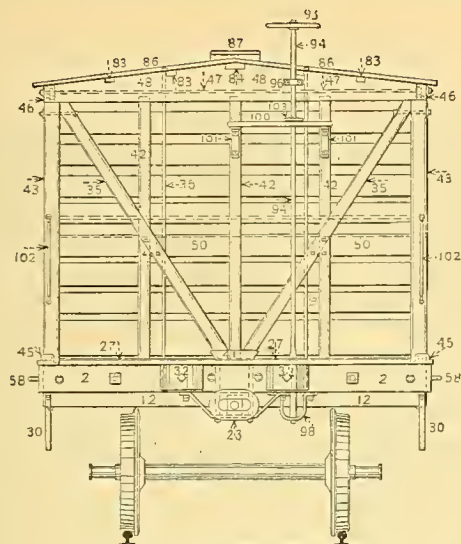


Fig. 131. End View.

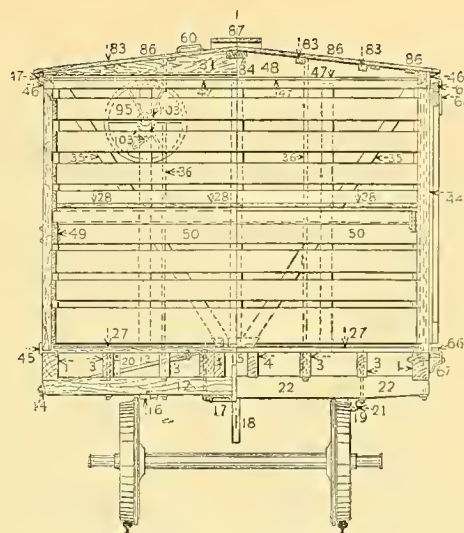


Fig. 135. Transverse Section.

DOUBLE-DECK STOCK CAR, PENNSYLVANIA RAILROAD.

(Old standard ; for new, see Figs. 136-138.)

## NAMES OF PARTS OF STOCK CAR, Figs. 132-135.

- |  |                                 |                         |                                |
|--|---------------------------------|-------------------------|--------------------------------|
| 1. Side-sill.                              | 23. Drawbar.                    | 45. Corner-post Pocket. | 84. Ridge-pole.                |
| 2. End-sill.                               | 26. Draw-timbers.               | 46. Plate.              | 85. Roof-braces.               |
| 3. Intermediate-sill.                      | 27. Floor.                      | 47. Plate-rod.          | 86. Roof-boards.               |
| 4. Centre-sill.                            | 28. Upper-floor or Double-deck. | 48. End-plate.          | 87. Running-board.             |
| 9. Sill Knee-iron.                         | 30. Sill-step.                  | 49. Girth.              | 93. Brake-wheel.               |
| 12. Body-bolster.                          | 31. Sill-step Stay.             | 50. End-girth.          | 94. Brake-shaft.               |
| 13. Body-bolster Truss-rod.                | 32. Dead-blocks.                | 58. Pull-iron.          | 95. Horizontal Brake-shaft.    |
| 14. Body-bolster Truss-rod Washer.         | 33. Side Body-brace.            | 60. Roof Grab-iron.     | 96. Upper Brake-shaft Bearing. |
| 15. Body-bolster Truss-block.              | 35. End Body-brace.             | 61. Grated-door.        | 98. Brake-shaft Step.          |
| 16. Body Side-bearing.                     | 36. Sill-and-plate Rod.         | 65. Top Door-track.     | 99. Brake-shaft Bracket.       |
| 17. Body Centre-plate.                     | 37. Body-counterbrace.          | 66. Bottom Door-track.  | 100. Brake-step.               |
| 18. King-bolt or Centre-pin.               | 40. Right-hand Brace-pocket.    | 67. Door-track Bracket. | 101. Brake-step Bracket.       |
| 19. Body Truss-rod.                        | 41. Double Brace-pocket.        | 68. Door-hanger.        | 102. Corner-handle.            |
| 20. Body Truss-rod Saddle.                 | 42. Body-post.                  | 69. Door-brace.         | 103. Brake Ratchet-wheel.      |
| 21. Body Truss-rod Bearing.                | 43. Corner-post.                | 70. Door-shoe.          | 105. Brake-shaft-chain Sheave. |
| 22. Needle-beam or Cross-frame Tie-timber. | 44. Door-post.                  | 71. Open-door Stop.     | 140. Coupling-pin.             |
|  |                                 | 81. Carline or Carling. |                                |
|  |                                 | 83. Purlin.             |                                |

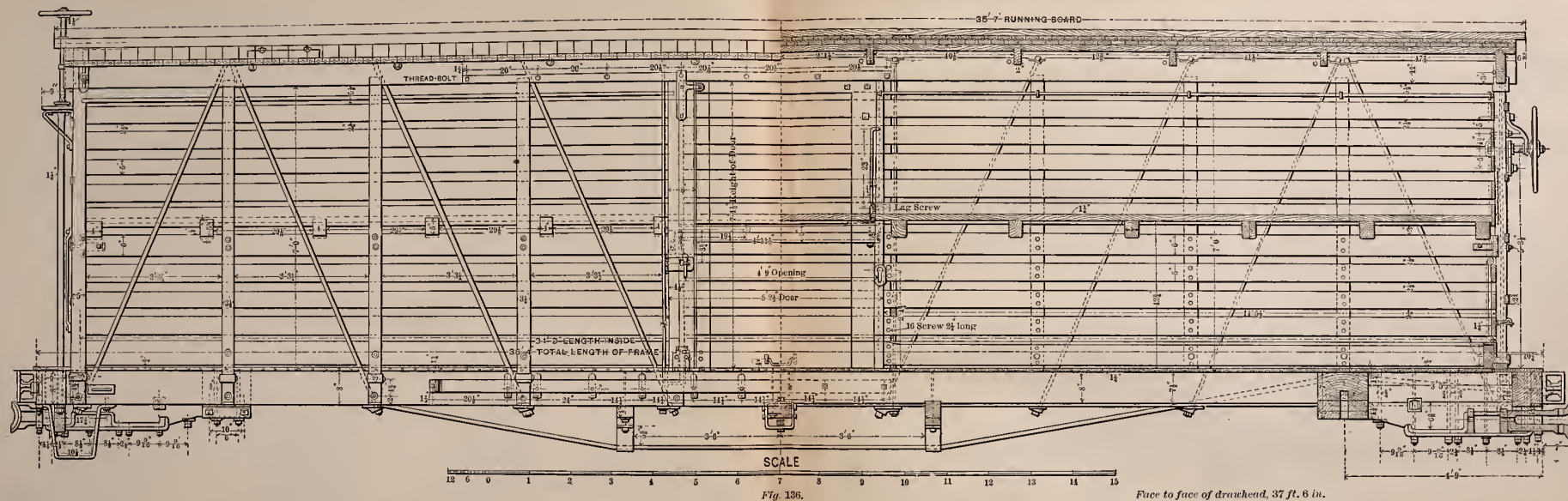














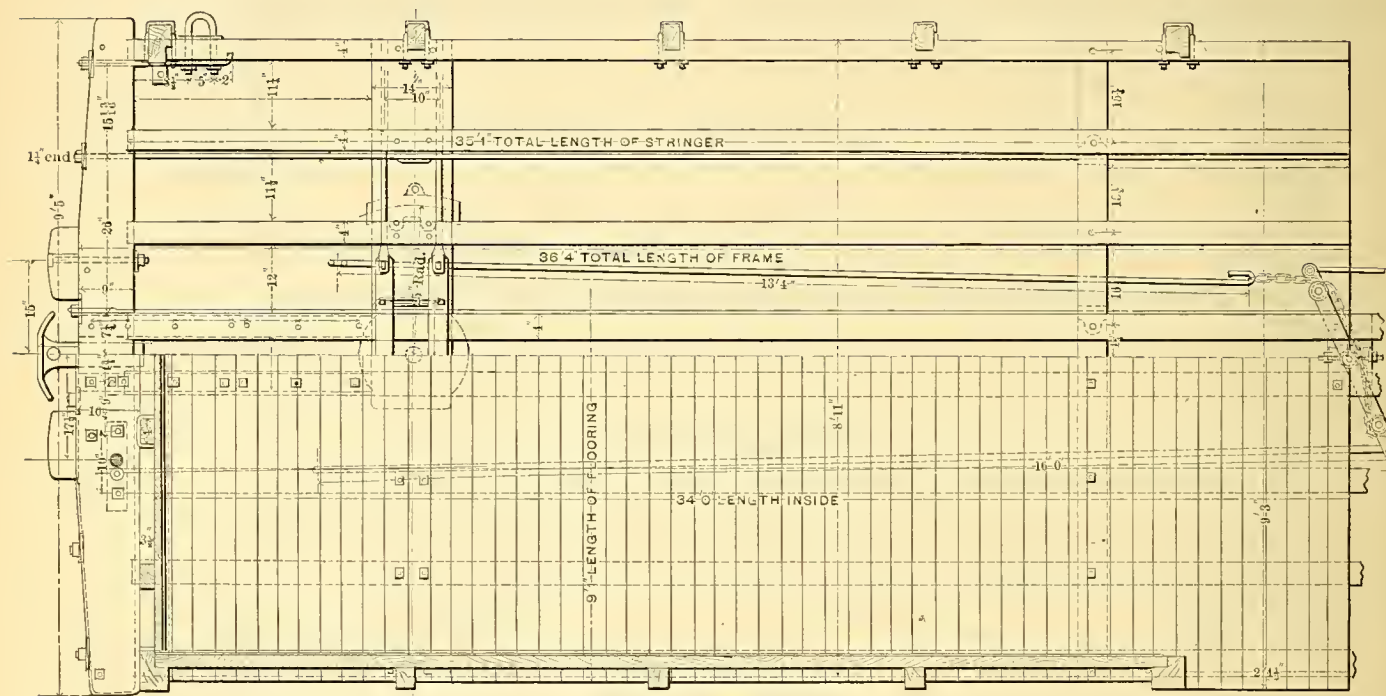


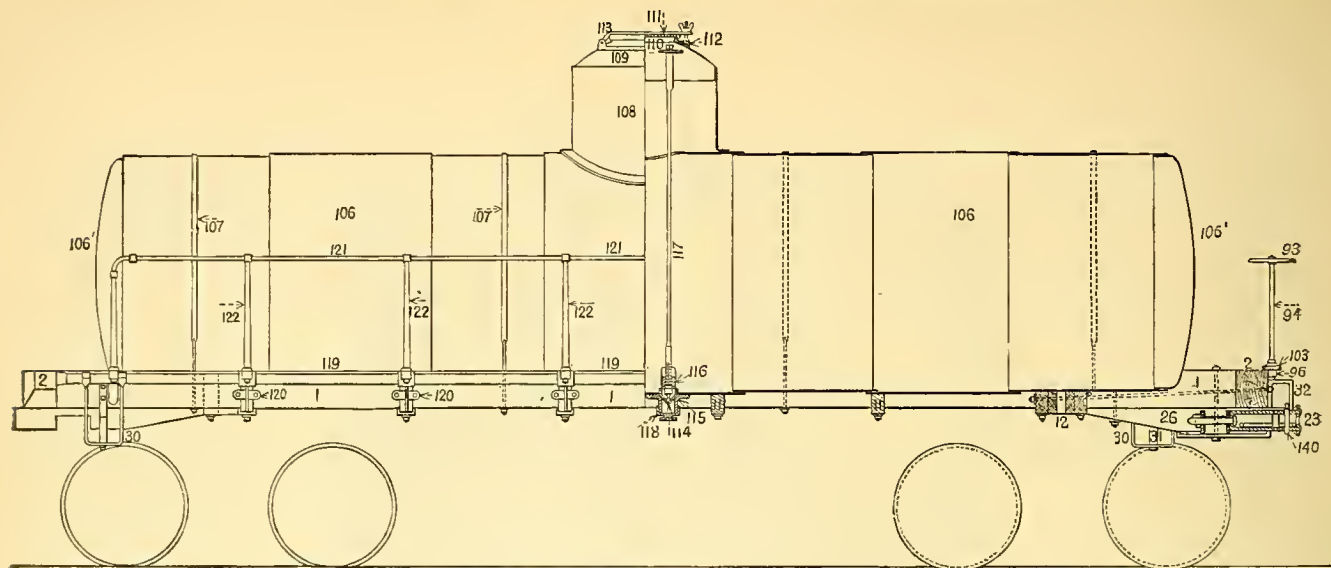
Fig. 137. Plan.

DOUBLE-DECK STOCK CAR, PENNSYLVANIA RAILROAD.

(Names of parts correspond in substance with those for the old design for the same car, Figs. 132-135.)



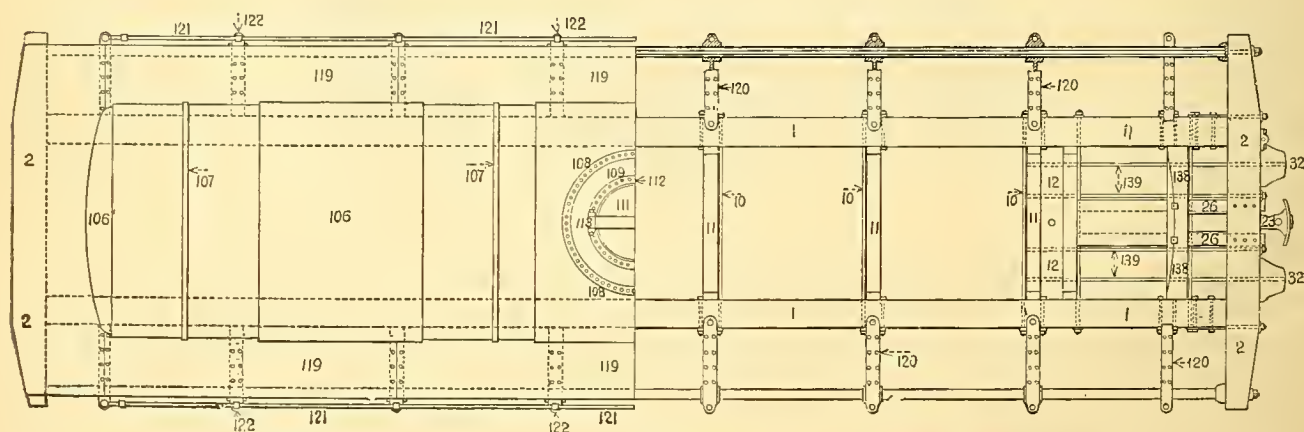




Outside View.

Fig. 139.

Longitudinal Section.



Half Plan.

Fig. 140.

Half Plan, showing Floor Framing.

TANK CAR OR OIL CAR.

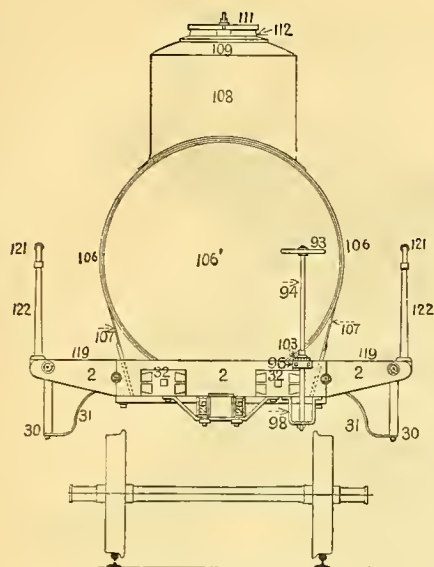


Fig. 141. End View.

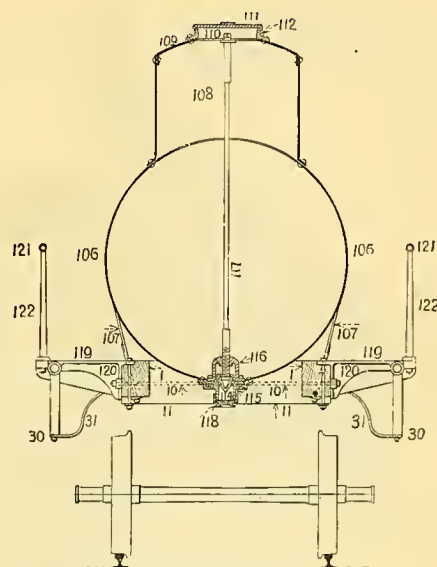


Fig. 142. Transverse Section.

## TANK CAR OR OIL CAR.

## NAMES OF PARTS OF TANK CAR; Figs. 139-142.

- |                               |                                |                                      |
|-------------------------------|--------------------------------|--------------------------------------|
| 1. Sill.                      | 96. Upper Brake-shaft Bearing. | 115. Tank-valve Seat or Tank-nozzle. |
| 2. End-sill.                  | 98. Brake-shaft Step.          | 116. Tank-valve Cage.                |
| 10. Sill Tie-rod.             | 106. Tank, for Tank-car.       | 117. Tank-valve Rod.                 |
| 11. Transverse Floor-timbers. | 106'. Tank-head.               | 118. Tank-nozzle Cap.                |
| 12. Body-bolster.             | 107. Tank-band.                | 119. Running-board.                  |
| 23. Draw-bar.                 | 108. Tank-dome.                | 120. Running-board Brackets.         |
| 26. Draw-timbers.             | 109. Dome-head.                | 121. Hand-rail.                      |
| 30. Sill-step.                | 110. Man-hole.                 | 122. Hand-rail Post.                 |
| 31. Sill-step Stay.           | 111. Man-hole Cover.           | 138. Drawbar Cross-timber.           |
| 32. Dead-blocks.              | 112. Man-hole Ring.            | 139. Draw-gear Tie-rod.              |
| 93. Brake Wheel.              | 113. Man-hole Hinge.           | 140. Coupling-pin.                   |
| 94. Brake Shaft.              | 114. Tank-valve.               |                                      |

(Parts special to this car, Nos. 11 and 106 to 122, inclusive.)



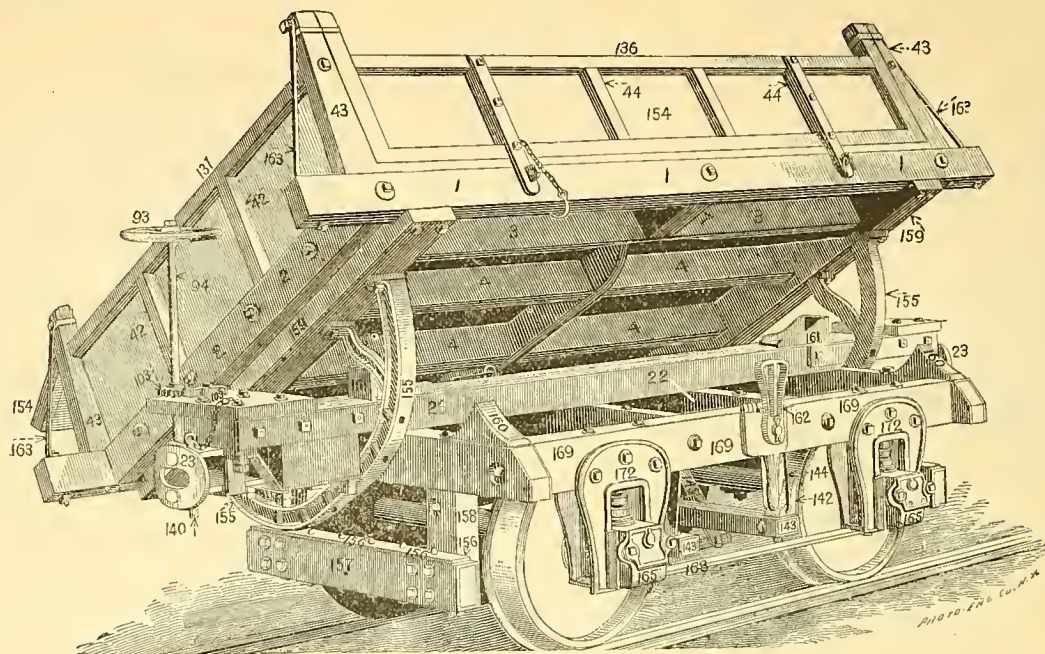


Fig. 143.

TIP CAR OR DUMP CAR.

(This car is mainly used for grading and construction purposes, and not for coal.)

## LIST OF NAMES OF PARTS.

1. Side-sill.
2. End-sill.
3. Intermediate-sill.
4. Centre-sill.
7. Floor-timber Distance-block.
22. Cross-frame Tie-timber.
23. Drawbar.
26. Draw-timber.
42. Body-post.
43. Corner-post.
44. Door-post.
93. Brake-wheel.

94. Brake-shaft.
103. Brake Ratchet-wheel.
- 103'. Brake pawl.
136. Top Side-rail.
137. Top End-rail.
140. Coupling-pin.
142. Brake-head.
143. Brake-beam.
144. Brake-hanger.
154. Tip-car Door.
155. Rocker.
156. Rocker-bearing.

157. Rocker-bearing Timber.
158. Rocker-bearing Timber-hanger.
159. Rocker-timber.
160. Side-rest.
161. Centre-stop.
162. Side-stop.
163. Corner-post Brace.
165. Journal box.
168. Pedestal Tie-bar.
169. Pedestal-timber.
172. Pedestal.

(Parts numbered 154 to 163, inclusive, are special to this car.)

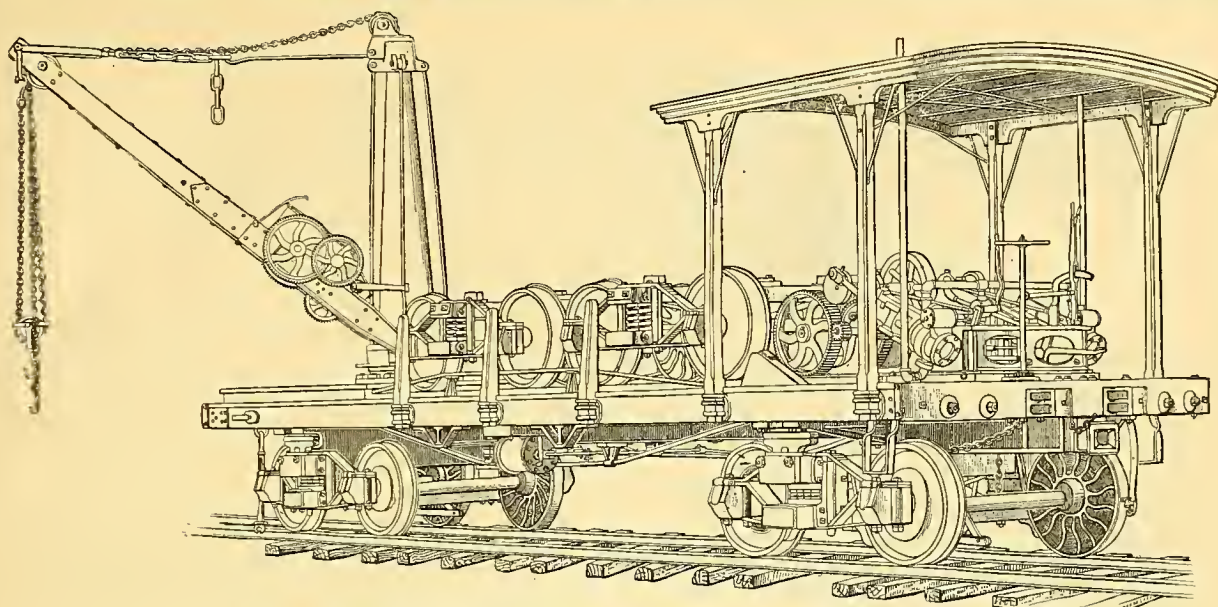


Fig. 144. STEAM DERRICK CAR, with IRON FRAME; BUFFALO, NEW YORK & PHILADELPHIA RAILROAD.

Showing CRABS or TONGS for fastening the car to the track.

Weight, 60,000 lbs. Length, out to out of drawbar, 33 ft. 0½ in.

(Other Wrecking and Derrick Cars are shown in Figs. 73 to 80.)

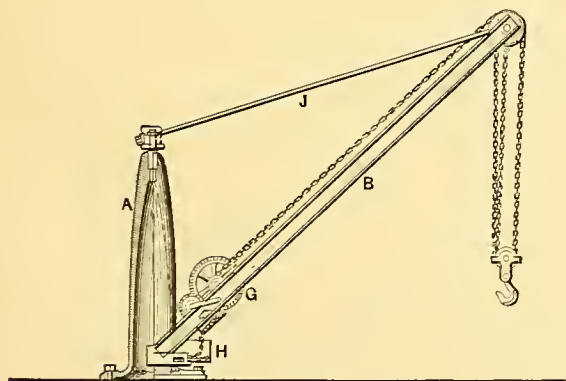


Fig. 145. PILLAR CRANE.

(Largely used on Wrecking Cars.)

NAMES OF PARTS, Fig. 145.

- A. Mast.
- B. Boom.
- G. Spur-wheel of Hoisting gear.
- H. Chain-box.
- J. Stay-rod or Tension-rod.



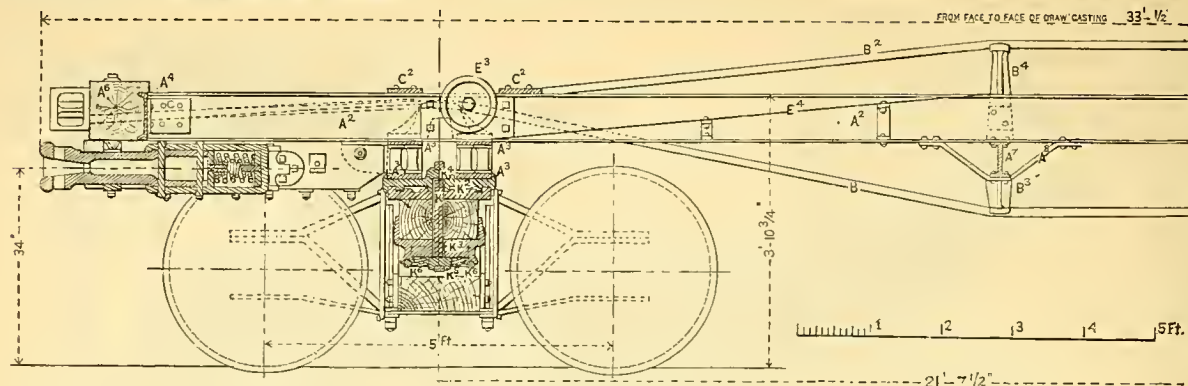


Fig. 146. Longitudinal Section.

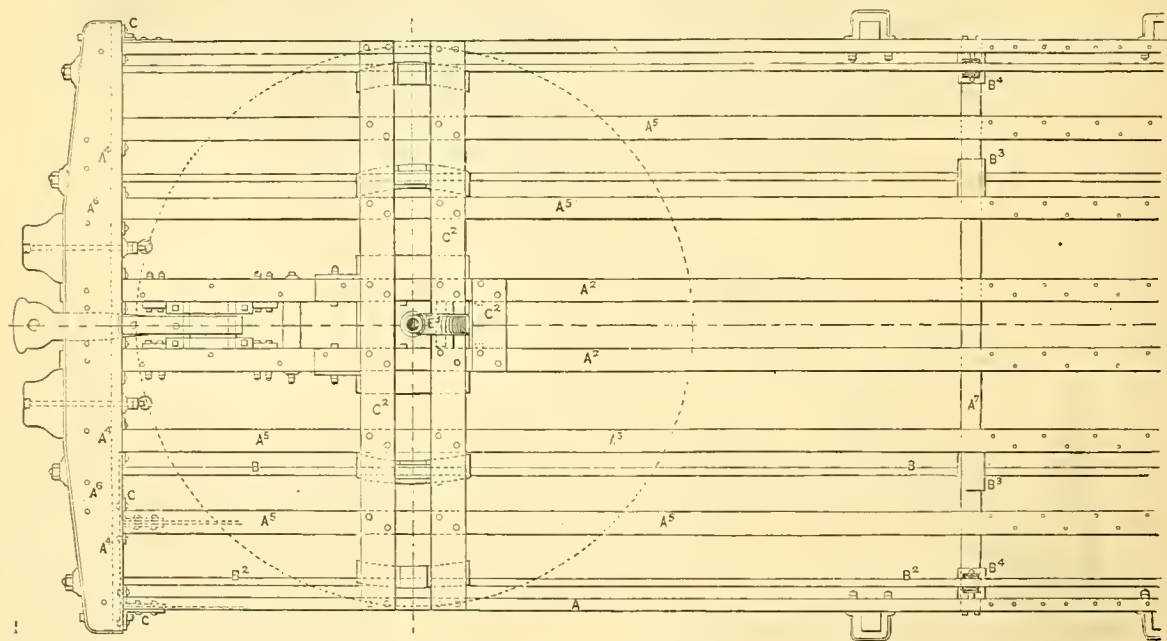
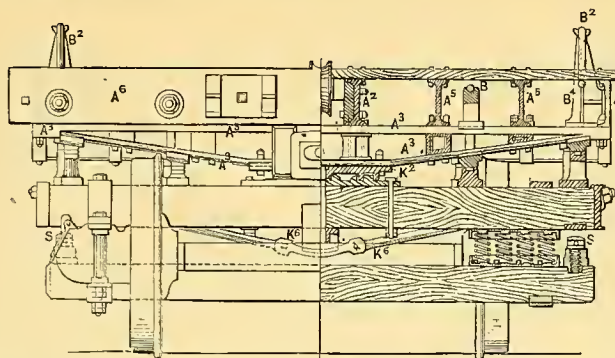


Fig. 147. Plan of Floor Frame.

STEAM DERRICK CAR, BUFFALO, NEW YORK & PHILADELPHIA RAILROAD.



End Elevation. Fig. 148. Section.

Outside Sills, A : 8" Channel Iron (52 lb.). Intermediate and Centre Sills : 8" I-beams (85 lb.). Needle-beams, 6" I-beams.

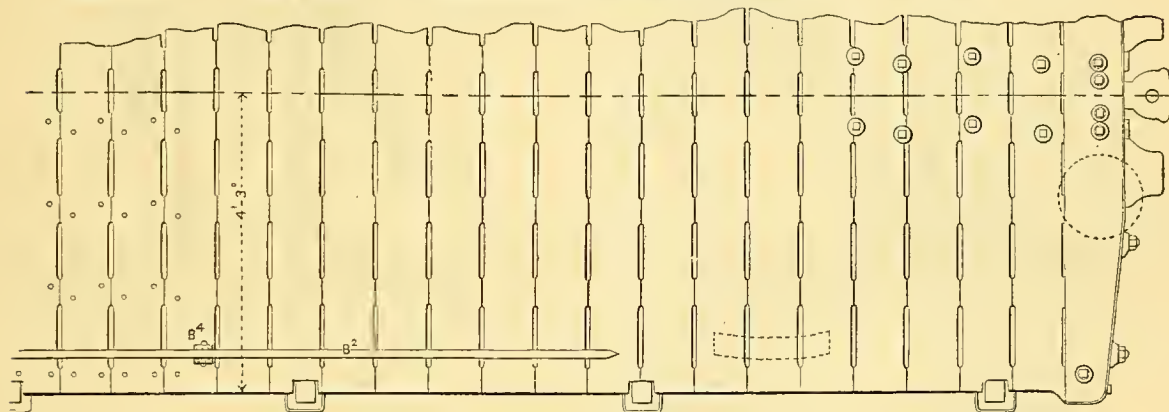


Fig. 149. Plan of Floor.

STEAM DERRICK CAR, with IRON FRAME. BUFFALO, NEW YORK & PHILADELPHIA RAILROAD. Figs. 144-153.

NAMES OF PARTS, Figs. 144-150.

- A. Side-sills.
- A<sup>2</sup>. Centre-sills.
- A<sup>3</sup>. Body-bolster.
- A<sup>4</sup>. End-sill Channel-bar.
- A<sup>5</sup>. Intermediate-sills.
- A<sup>6</sup>. End-sill.
- A<sup>7</sup>. Needle-beam.
- B. Body Truss rod.
- B<sup>2</sup>. Hog-chain or Inverted Truss-rod.
- B<sup>3</sup>. Queen-Post.

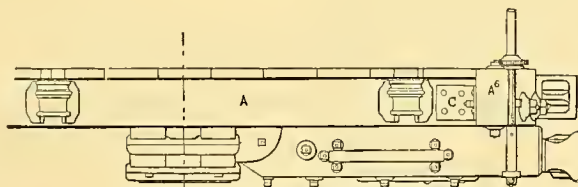


Fig. 150. Side Elevation of Draw-gear.

- B<sup>4</sup>. Hog-chain Queen-post.
- C. End-sill Brackets.
- C<sup>2</sup>. Tie-plates.
- E<sup>3</sup>. Hoisting-chain Sheave.
- K. King-bolt or Centre-pin.
- K<sup>2</sup>. Centre Plates.
- K<sup>3</sup>. Truck-bolster Truss-rod Bearing.
- K<sup>4</sup>. Upper King-bolt Key.
- K<sup>5</sup>. Lower King-bolt Key.
- K<sup>6</sup>. Truck-bolster Truss-rods.
- S. Bolster Jack-screws.



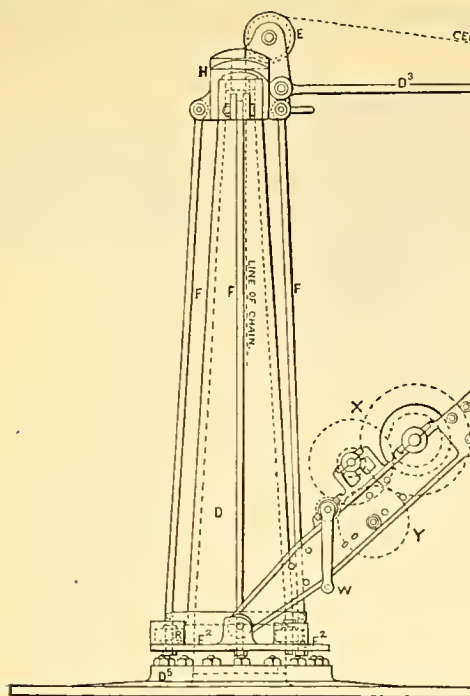


Fig. 151. Side Elevation, Mast and Boom.

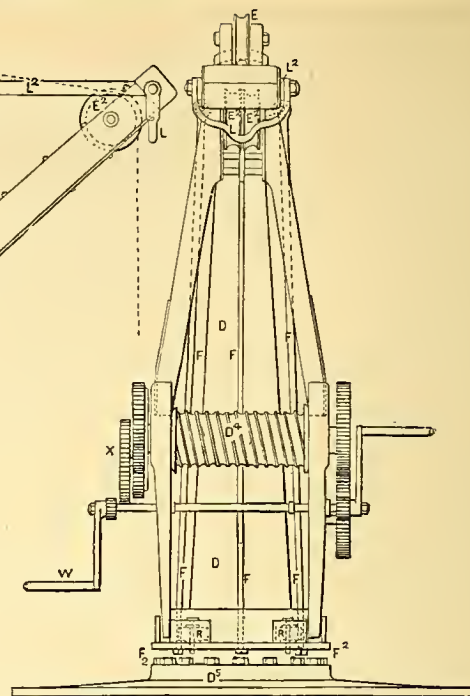


Fig. 152. End Elevation, Mast and Winding Drum.

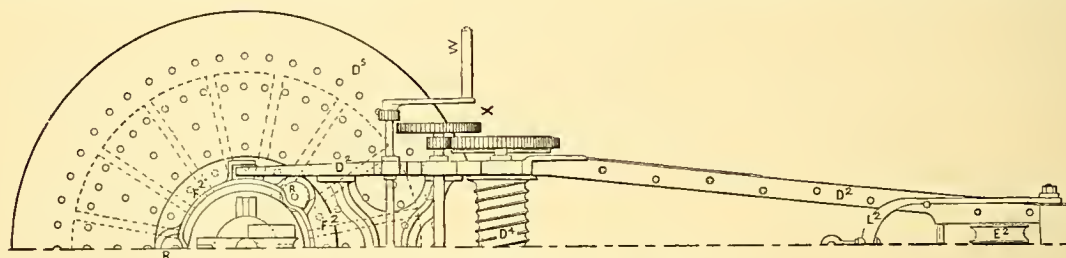


Fig. 153. Half Plan of Cap, Drum and Boom.

DERRICK FOR WRECKING CAR, Figs. 144-150.

NAMES OF PARTS OF DERRICK, Figs. 151-153.

D. Mast.  
 D². Boom.  
 D³. Stay-rod or Tension-rod.  
 D⁴. Drum.  
 D⁵. Base-plate.  
 E. Mast-sheave.

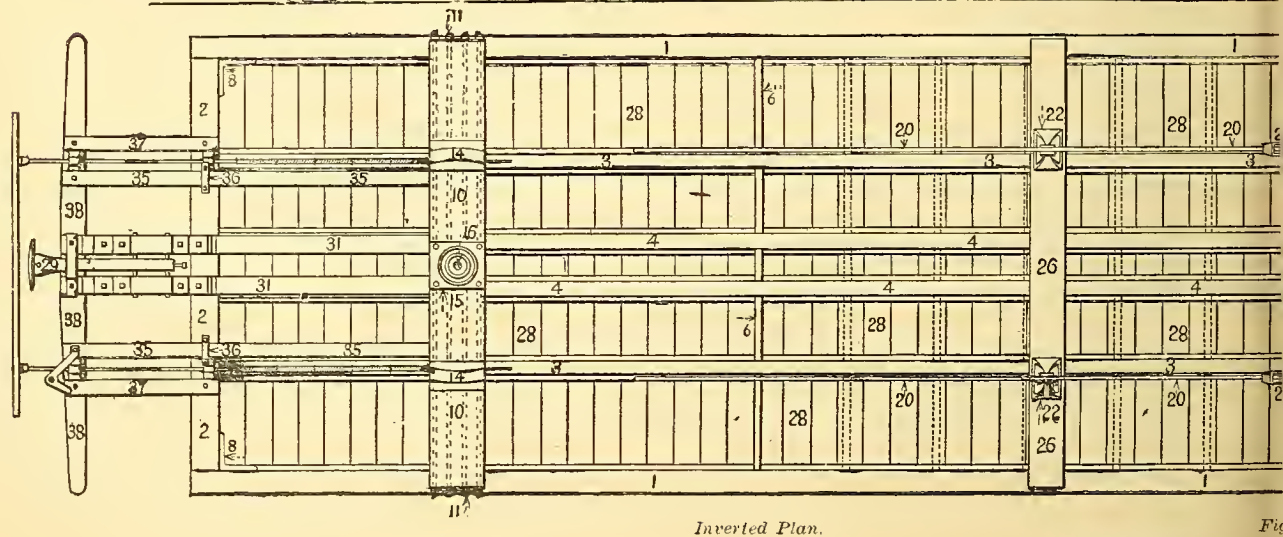
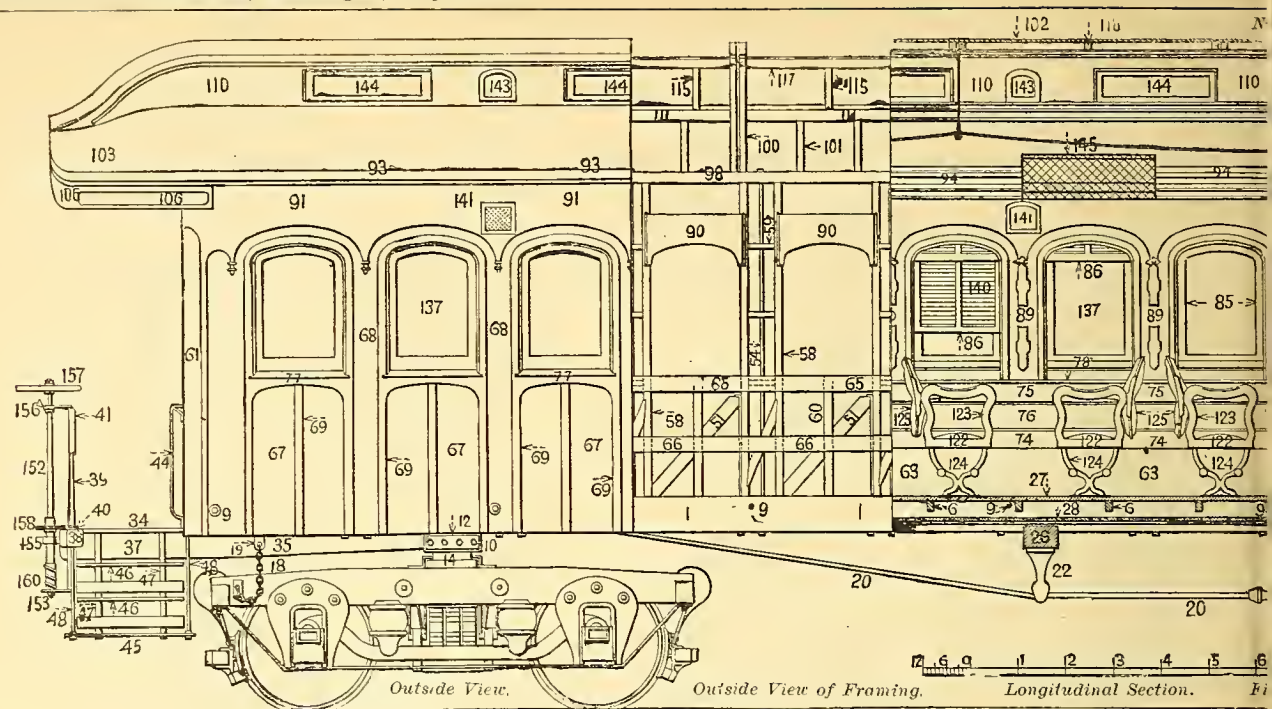
E². Boom-sheave.  
 F. Boom-shoe Rods.  
 F². Boom-shoe.  
 H. Head-block or Cap.  
 I². Boom Clevis.  
 L². Tension-rod Clevis.

R. Boom-shoe Rollers.  
 W. Crank, or Driving Shaft, with Shifting-pinion.  
 X. Intermediate or Slow-motion Gear.  
 Y. Quick-motion Gear.

NAMES OF PARTS; *Figs. 155-158.* PASSENGER CAR-BODY, CENTRAL RAILROAD OF NEW JERSEY.

- |                                      |                                     |                                      |                                   |
|--------------------------------------|-------------------------------------|--------------------------------------|-----------------------------------|
| 1. <i>Side-sills.</i>                | 38. <i>Platform End-timber, or</i>  | 78. <i>Inside Window-sill.</i>       | 124. <i>Seat-stand.</i>           |
| 2. <i>End-sills.</i>                 | <i>Buffer-beam.</i>                 | 85. <i>Window-sash.</i>              | 125. <i>Seat-back.</i>            |
| 3. <i>Intermediate-sills.</i>        | 39. <i>Platform-post.</i>           | 86. <i>Window-blind Sash</i>         | 127. <i>Foot rest.</i>            |
| 4. <i>Centre-sills.</i>              | 40. <i>Base-washer, for Plat-</i>   | <i>(lower and upper).</i>            | 128. <i>Stove, or Heater.</i>     |
| 6. <i>Bridging.</i>                  | <i>form-post.</i>                   | 89. <i>Inside Window-panel.</i>      | 129. <i>Stove-pipe Jack.</i>      |
| 8. <i>Sill Knee-iron.</i>            | 41. <i>Platform-rail.</i>           | 90. <i>Window-lintel.</i>            | 130. <i>Saloon.</i>               |
| 9. <i>Sill Tie-rod.</i>              | 42. <i>Platform-railling Chain.</i> | 91. <i>Letter-board.</i>             | 131. <i>Closet Hopper.</i>        |
| 10. <i>Body-bolster.</i>             | 44. <i>Body Hand-rail.</i>          | 93. <i>Eaves-moulding.</i>           | 132. <i>Urinal.</i>               |
| 11. <i>Body-bolster Truss-rod.</i>   | 45. <i>Platform-steps.</i>          | 94. <i>Inside-cornice.</i>           | 133. <i>Water-cooler.</i>         |
| 12. <i>Body-bolster Truss-rod</i>    | 46. <i>Tread-board.</i>             | 98. <i>Plate.</i>                    | 136. <i>Lamp-jack.</i>            |
| <i>Washer.</i>                       | 47. <i>Step-iron.</i>               | 99. <i>Door-lintel.</i>              | 137. <i>Window.</i>               |
| 13. <i>Body-bolster Truss-block.</i> | 48. <i>Step-hanger.</i>             | 100. <i>Carline, or Compound-</i>    | 140. <i>Window-blind.</i>         |
| 14. <i>Body Side-bearings.</i>       | 51. <i>Side Body-brace.</i>         | <i>carline.</i>                      | 141. <i>Frieze-ventilator.</i>    |
| 15. <i>Body Centre-plate.</i>        | 53. <i>Brace Straining-rod.</i>     | 101. <i>Rafter.</i>                  | 142. <i>End-ventilator.</i>       |
| 16. <i>King-bolt.</i>                | 54. <i>Sill-and-plate Rod.</i>      | 102. <i>Roof-boards.</i>             | 143. <i>Deck Side Ventilator.</i> |
| 17. <i>King-bolt Plate.</i>          | 55. <i>Body Counterbrace.</i>       | 103. <i>Platform-roof.</i>           | 144. <i>Deck Sash, or Window.</i> |
| 18. <i>Check-chain.</i>              | 58. <i>Window-post.</i>             | 104. <i>Platform-roof Carline.</i>   | 145. <i>Basket rack.</i>          |
| 19. <i>Body Check-chain Eye.</i>     | 59. <i>Window-panel Furring.</i>    | 105. <i>Platform-roof End-car-</i>   | 146. <i>Door-mullion.</i>         |
| 20. <i>Body Truss-rod.</i>           | 60. <i>Stud.</i>                    | <i>line.</i>                         | 148. <i>Middle Door-rail.</i>     |
| 21. <i>Body Truss-rod Saddle.</i>    | 61. <i>Corner-post.</i>             | 106. <i>Roof-apron.</i>              | 149. <i>Top-rail, of Door.</i>    |
| 22. <i>Body Queen-post.</i>          | 62. <i>Door-post.</i>               | 110. <i>Clear-story, or Upper</i>    | 150. <i>Door-stile.</i>           |
| 23. <i>Turnbuckle.</i>               | 63. <i>Truss-plank.</i>             | <i>Deck.</i>                         | 151. <i>Door panel.</i>           |
| 26. <i>Needle-beam, or Cross-</i>    | 65. <i>Belt-rail.</i>               | 111. <i>Deck Sill.</i>               | 152. <i>Brake-shaft.</i>          |
| <i>frame Tie-timber.</i>             | 66. <i>Panel-rail.</i>              | 113. <i>Deck End-sill.</i>           | 153. <i>Brake-shaft Slep.</i>     |
| 27. <i>Main Floor, or Car Floor.</i> | 67. <i>Outside-panel.</i>           | 115. <i>Deck Post.</i>               | 155. <i>Lower Brake-shaft</i>     |
| 28. <i>Deafening-ceiling.</i>        | 68. <i>Outside Window-panel.</i>    | 116. <i>Deck End-panel, or</i>       | <i>Bearing.</i>                   |
| 29. <i>Drawbar.</i>                  | 69. <i>Panel-strips.</i>            | <i>Ventilator.</i>                   | 156. <i>Upper Brake-shaft</i>     |
| 30. <i>Draw-spring.</i>              | 70. <i>End-panel.</i>               | 117. <i>Deck Plate.</i>              | <i>Bearing.</i>                   |
| 31. <i>Draw-timbers.</i>             | 71. <i>End Window-panel.</i>        | 118. <i>Upper-deck Carline.</i>      | 157. <i>Brake-wheel.</i>          |
| 34. <i>Platform, Platform-floor.</i> | 74. <i>Lower Wainscot-rail.</i>     | 122. <i>Car Seat.</i>                | 158. <i>Brake Ratchet-wheel.</i>  |
| 35. <i>Platform-sills.</i>           | 75. <i>Upper Wainscot-rail.</i>     | 123. <i>Seat-end, or Aisle Seat-</i> | 159. <i>Brake-pawl.</i>           |
| 36. <i>Platform-timber Clamps.</i>   | 76. <i>Wainscot-panel.</i>          | <i>end.</i>                          | 160. <i>Brake-chain Worm.</i>     |
| 37. <i>Platform Short-sills.</i>     | 77. <i>Outside Window-sill.</i>     |                                      |                                   |











Numbers refer to List of Names of Parts on preceding page.

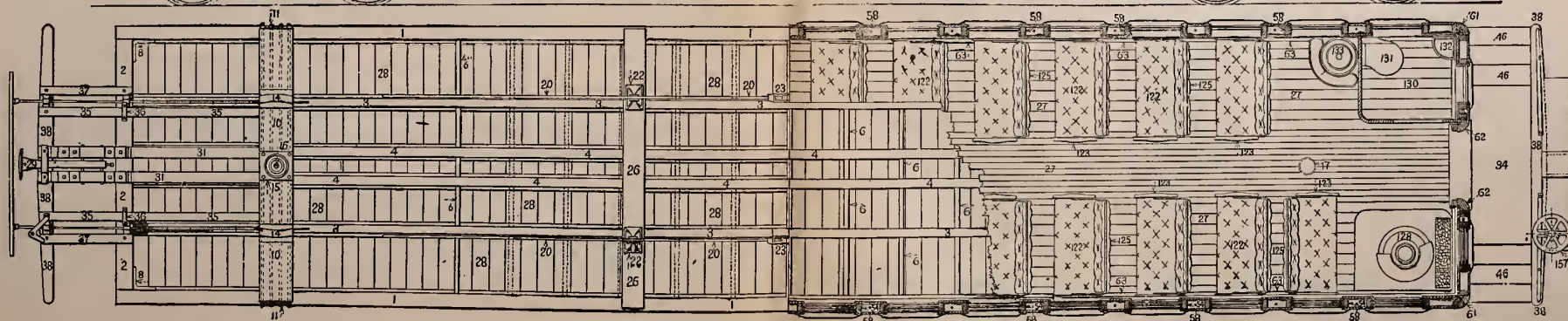
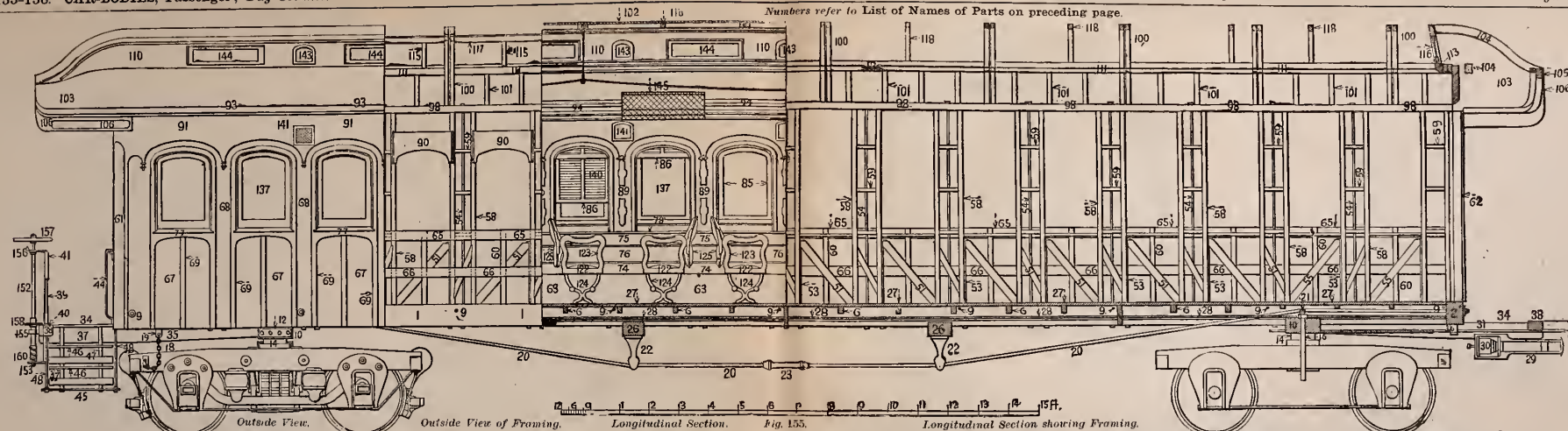
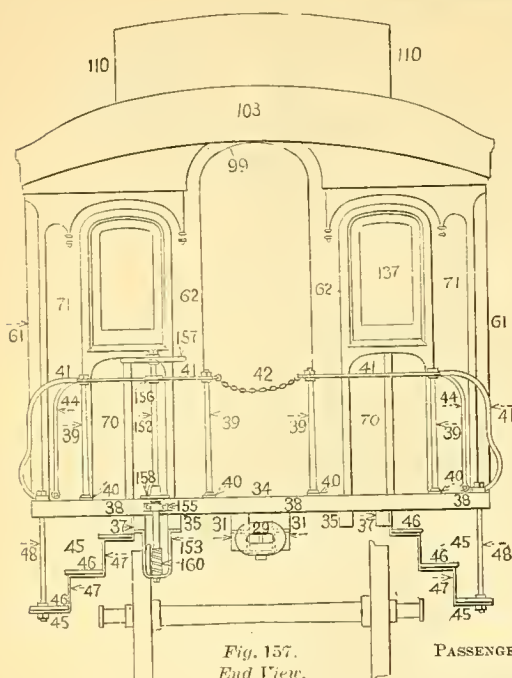
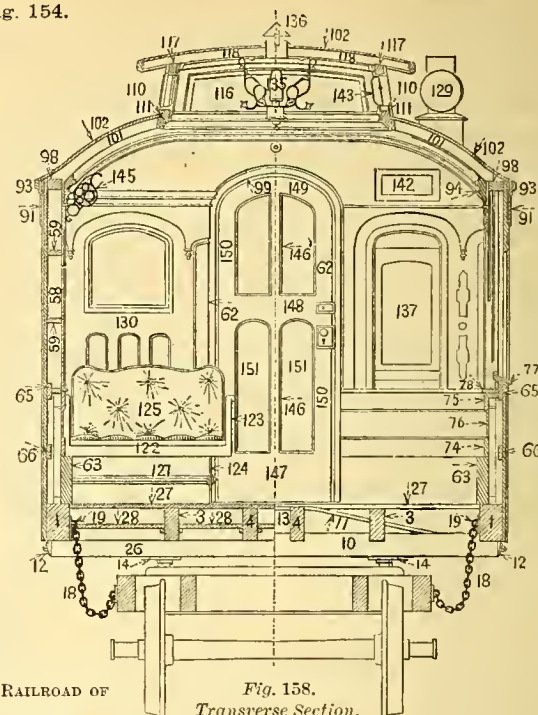


Fig. 156. Plan showing Floor Framing  
PASSENGER CAR-BODY, CENTRAL RAILROAD OF NEW JERSEY.



Numbers refer to List of Names of Parts with Fig. 154.

Fig. 157.  
End View.PASSENGER CAR-BODY, CENTRAL RAILROAD OF  
NEW JERSEY.  
With INTERMEDIATE FLOOR but no DEAFENING-CEILING.Fig. 158.  
Transverse Section.

## NAMES OF PARTS: Figs. 157-158.

- |                               |                             |                               |                            |
|-------------------------------|-----------------------------|-------------------------------|----------------------------|
| 10. Body bolster.             | 40. Base-washer, for Plat-  | 91. Letter-board.             | 130. Saloon.               |
| 11. Body-bolster Truss-rod.   | form-post.                  | 93. Eaves-moulding.           | 135. Centre-lamp.          |
| 12. Body-bolster Truss-rod    | 41. Platform-rail.          | 94. Inside-cornice.           | 136. Lamp-jack.            |
| Washer.                       | 42. Platform-railing Chain. | 98. Plate.                    | 137. Window.               |
| 13. Body-bolster Truss-block. | 44. Body Hand-rail.         | 99. Door-lintel.              | 142. End-ventilator.       |
| 14. Body Side-bearings.       | 45. Platform-steps.         | 101. Rafter.                  | 143. Deck Side Ventilator. |
| 18. Check-chain.              | 46. Tread-board.            | 102. Roof-boards.             | 145. Basket-rack.          |
| 19. Body-check-chain Eye.     | 47. Step-iron.              | 103. Platform-roof.           | 146. Door-mullion.         |
| 26. Needle-beam or Cross-     | 48. Step-hanger.            | 110. Clear-story or Upper     | 147. Bottom-rail of Door.  |
| frame Tie-timber.             | 58. Window-post.            | Deck.                         | 148. Middle Door-rail.     |
| 27. Main Floor or Car Floor.  | 59. Window-panel Furring.   | 111. Deck Sill.               | 149. Top-rail of Door.     |
| 28. Deafening ceiling.        | 61. Corner post.            | 116. Deck End-panel or        | 150. Door-stile.           |
| 29. Drawbar.                  | 62. Door-post.              | Ventilator.                   | 151. Door-panel.           |
| 30. Draw-spring.              | 63. Truss-plank.            | 117. Deck Plate.              | 152. Brake-shaft.          |
| 31. Draw-timbers.             | 65. Belt-rail.              | 118. Upper-deck Carline.      | 153. Brake-shaft Step.     |
| 34. Platform. Platform-       | 66. Panel-rail.             | 122. Car Seat.                | 155. Lower Brake-shaft     |
| floor.                        | 70. End-panel.              | 123. Seat-end, or Aisle Seat- | Bearing.                   |
| 35. Platform-sills.           | 71. End Window-panel.       | end.                          | 156. Upper Brake-shaft     |
| 37. Platform Short-sills.     | 74. Lower Wainscot-rail.    | 124. Seat-stand.              | Bearing.                   |
| 38. Platform End-timber or    | 75. Upper Wainscot-rail.    | 125. Seat-back.               | 157. Brake-wheel.          |
| Buffer-beam.                  | 76. Wainscot-panel.         | 127. Foot-rest.               | 158. Brake Ratchet-wheel.  |
| 39. Platform-post.            | 77. Outside Window-sill.    | 129. Stove-pipe Jack.         | 160. Brake-chain Worm.     |

NAMES OF PARTS; *Figs. 159-160.* CHAIR CAR, CHICAGO & ALTON RAILROAD, ON FOLLOWING PAGE.

- |  |                                  |   |
|--|----------------------------------|---|
| 1. <i>Side-sills.</i>                              | 45. <i>Platform-steps.</i>       | 100. <i>Carline, or Compound-carline.</i>     |
| 2. <i>End-sills.</i>                               | 46. <i>Tread-board.</i>          | 101. <i>Rafter.</i>                           |
| 3. <i>Intermediate-sills.</i>                      | 54. <i>Sill and Plate Rod.</i>   | 103. <i>Platform-roof.</i>                    |
| 4. <i>Centre-sills.</i>                            | 58. <i>Window-post.</i>          | 106. <i>Roof-apron.</i>                       |
| 6. <i>Bridging.</i>                                | 59. <i>Window-panel Furring.</i> | 110. <i>Clear-story, or Upper Deck.</i>       |
| 9. <i>Sill Tie-rod.</i>                            | 60. <i>Stud.</i>                 | 111. <i>Deck Sill.</i>                        |
| 10. <i>Body-bolster.</i>                           | 61. <i>Corner-post.</i>          | 115. <i>Deck Post.</i>                        |
| 14. <i>Body Side-bearings.</i>                     | 63. <i>Truss-plank.</i>          | 117. <i>Deck Plate.</i>                       |
| 18. <i>Check-chain.</i>                            | 65. <i>Belt-rail.</i>            | 118. <i>Upper-deck Carline.</i>               |
| 19. <i>Body-check-chain Eye.</i>                   | 66. <i>Panel-rail.</i>           | 122. <i>Car Seat.</i>                         |
| 20. <i>Body Truss-rod.</i>                         | 67. <i>Outside-panel.</i>        | 124. <i>Seat-stand.</i>                       |
| 22. <i>Body Queen-post.</i>                        | 68. <i>Outside Window-panel.</i> | 137. <i>Window.</i>                           |
| 23. <i>Turnbuckle.</i>                             | 69. <i>Panel-strips.</i>         | 144. <i>Deck Sash, or Window.</i>             |
| 24. <i>Truss-rod Iron.</i>                         | 74. <i>Lower Wainscot-rail.</i>  | 145. <i>Basket-rack.</i>                      |
| 26. <i>Needle-beam, or Cross-frame Tie-timber.</i> | 75. <i>Upper Wainscot-rail.</i>  | 163. <i>Compression Beam.</i>                 |
| 27. <i>Main Floor, or Car Floor.</i>               | 76. <i>Wainscot-panel.</i>       | 164. <i>Compression Beam Brace.</i>           |
| 28. <i>Deafening-ceiling.</i>                      | 77. <i>Outside Window-sill.</i>  | 165. <i>Counterbrace.</i>                     |
| 34. <i>Platform, Platform-floor.</i>               | 78. <i>Inside Window-sill.</i>   | 166. <i>End Counterbrace.</i>                 |
| 37. <i>Platform Short-sills.</i>                   | 85. <i>Window-sash.</i>          | 167. <i>Body Brace Rod, or Hog-chain Rod.</i> |
| 38. <i>Platform End-timber, or Buffer-beam.</i>    | 89. <i>Inside Window-panel.</i>  | 168. <i>Body Counterbrace Rod.</i>            |
| 39. <i>Platform-post.</i>                          | 91. <i>Letter-board.</i>         | 169. <i>End Compression Beam.</i>             |
| 40. <i>Base-washer, for Platform-post.</i>         | 93. <i>Eaves-moulding.</i>       | 170. <i>Upper Deck, or Clear-story.</i>       |
| 41. <i>Platform-rail.</i>                          | 94. <i>Inside-eornice.</i>       | 171. <i>Lower Deck.</i>                       |
|  | 98. <i>Plate.</i>                |   |



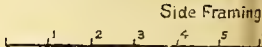


Fig. 159. Side

(Different modifications of this general style of framing are shown in .

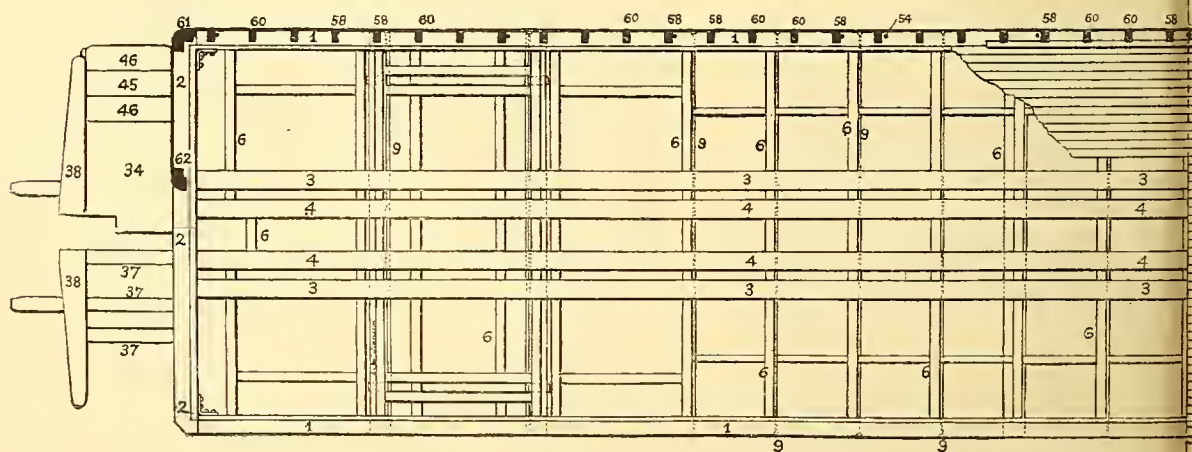
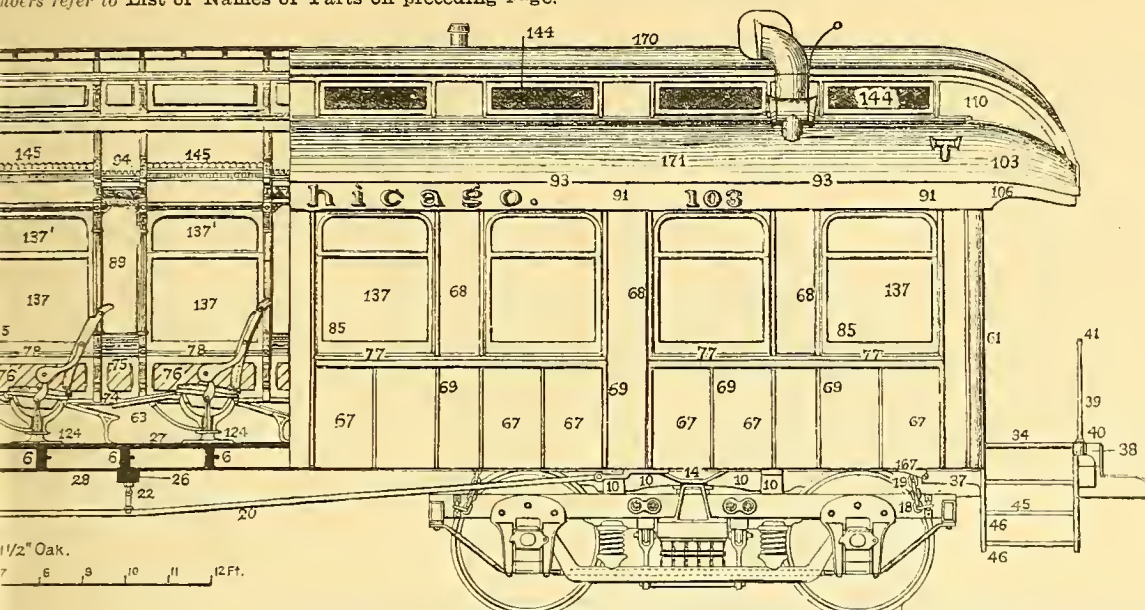


Fig. 160

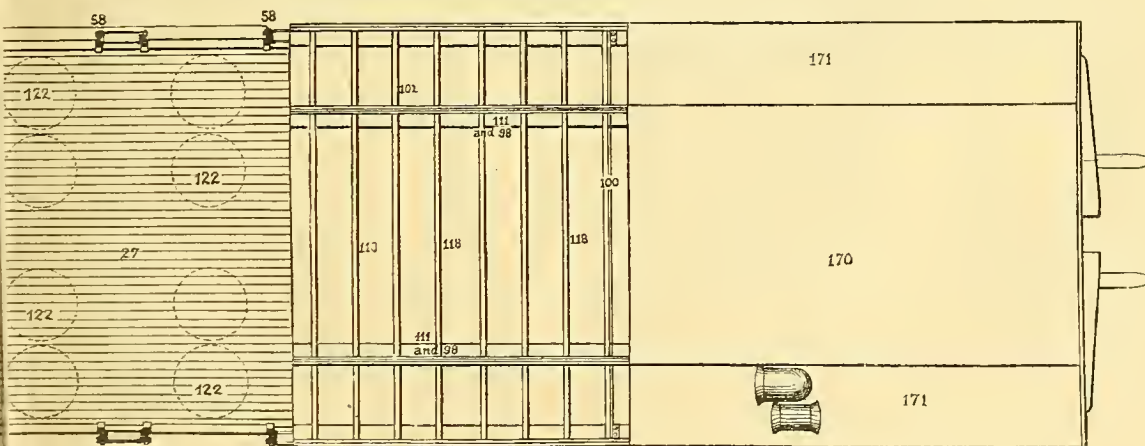
STANDARD CHAIR CAR, CHICAGO

(A general view of this car, showing exterior.)

Numbers refer to List of Names of Parts on preceding page.



rotation.  
644-645. Another example of the same style is shown in Fig. 199.)



10.  
& ALTON RAILROAD.  
ul appearance, is given in Fig. 53.)





Numbers refer to List of Names of Parts on preceding Page.

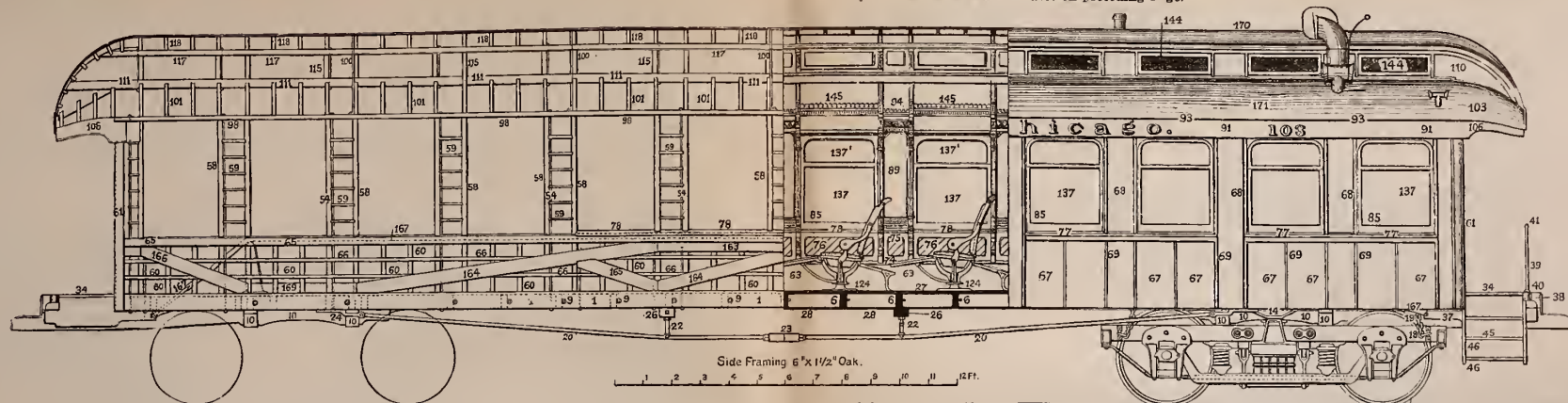


Fig. 159. Side Elevation.

(Different modifications of this general style of framing are shown in Figs. 644-645. Another example of the same style is shown in Fig. 193.)

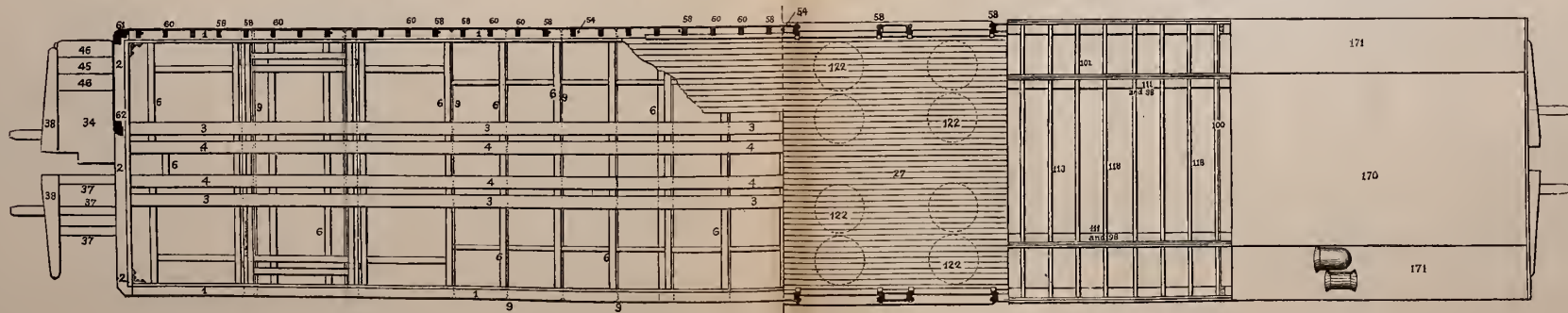


Fig. 160. Plan.

STANDARD CHAIR CAR, CHICAGO &amp; ALTON RAILROAD.

(A general view of this car, showing external appearance, is given in Fig. 53.)



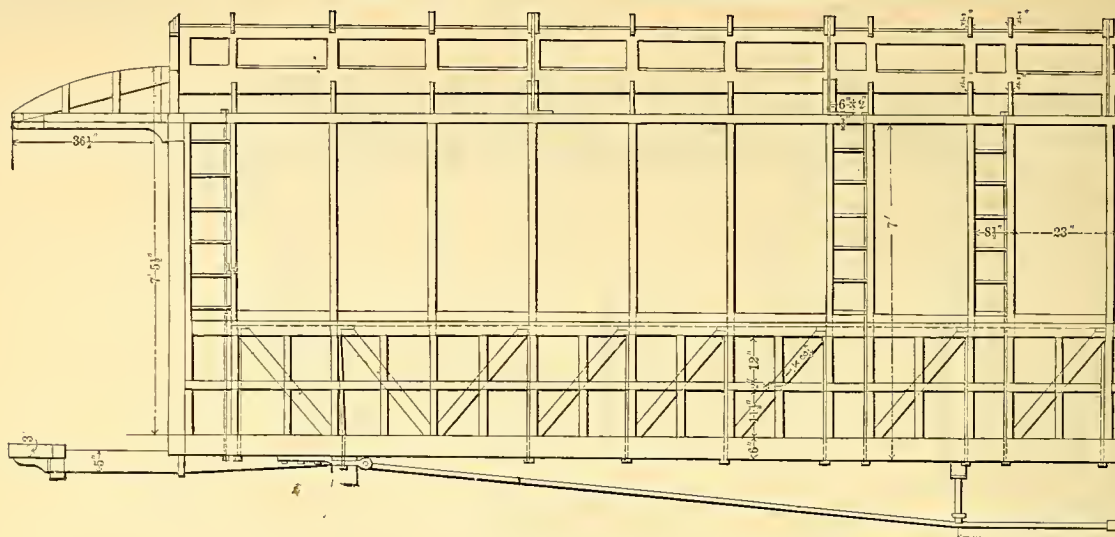


Fig. 161. Framing.

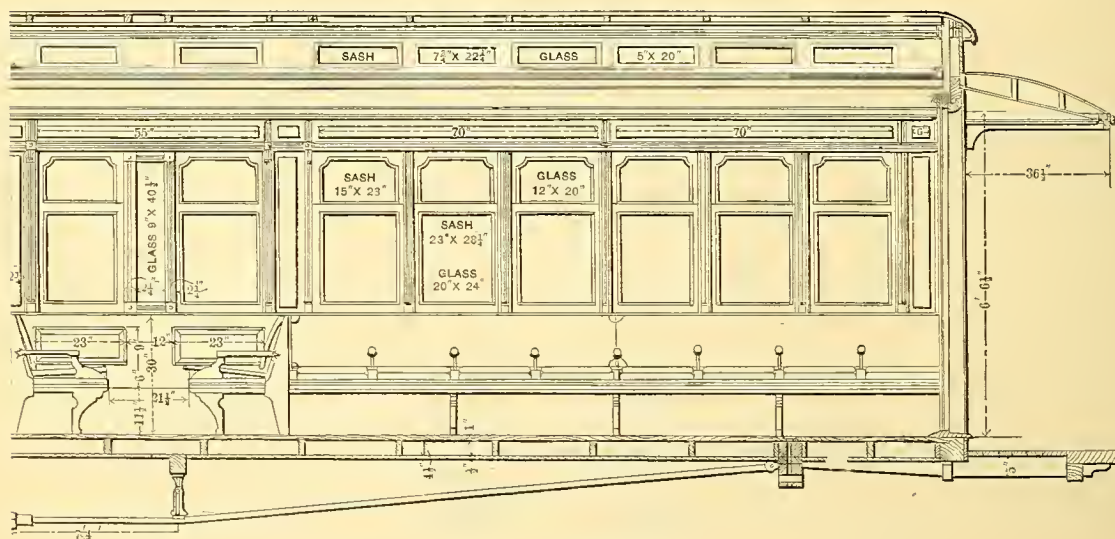
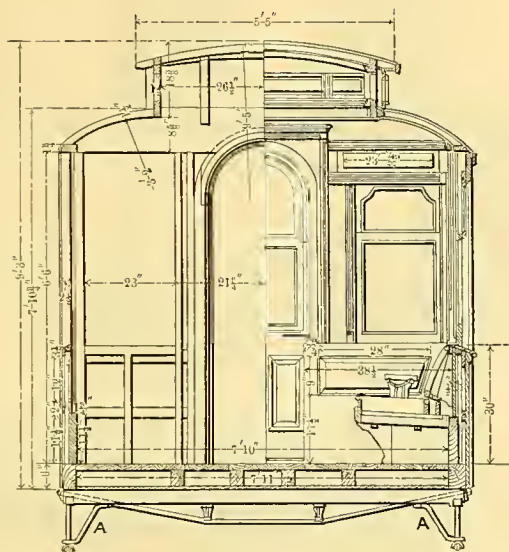


Fig. 162. Longitudinal Section.

PASSENGER CAR-BODY (New Standard), MANHATTAN ELEVATED RAILROAD OF NEW YORK.



*Fig. 163.*

*Transverse Section.*

(Scale :  $\frac{1}{4}$  inch to a foot.)

PASSENGER CAR-BODY (*New Standard*) MANHATTAN ELEVATED RAILROAD, OF NEW YORK.

**A. Body Queen-post Stay.**

(Names of the various parts are practically the same as in the old standard, Figs. 164-168, on the following pages; the designs differing chiefly in style of finish; notably in respect to the windows and seats. The framing is practically identical in style. Consequently reference numbers to the various parts have not been added.)



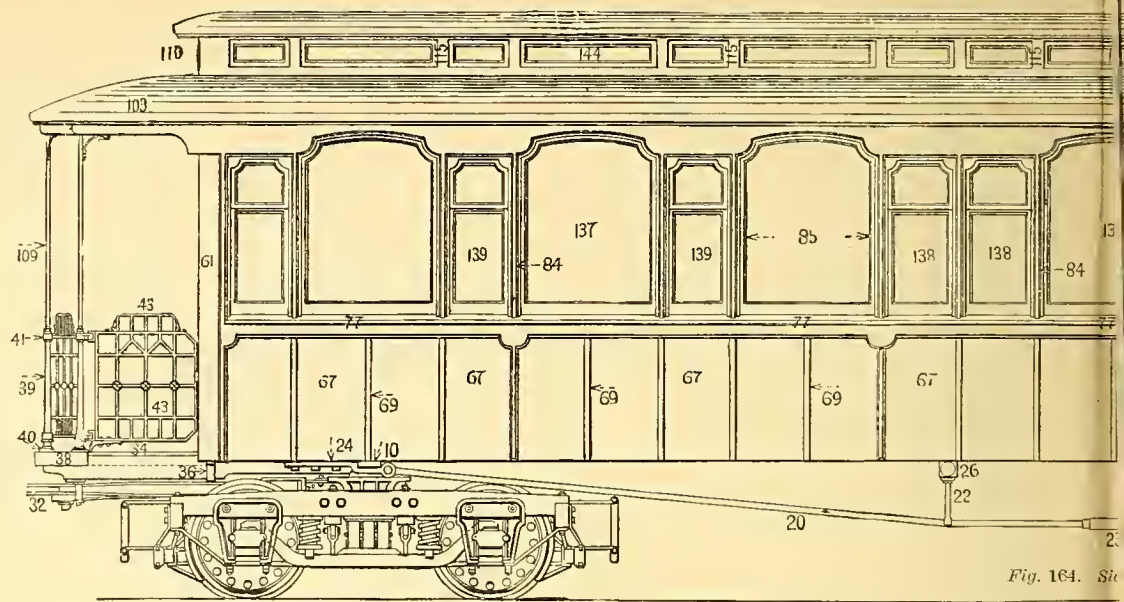
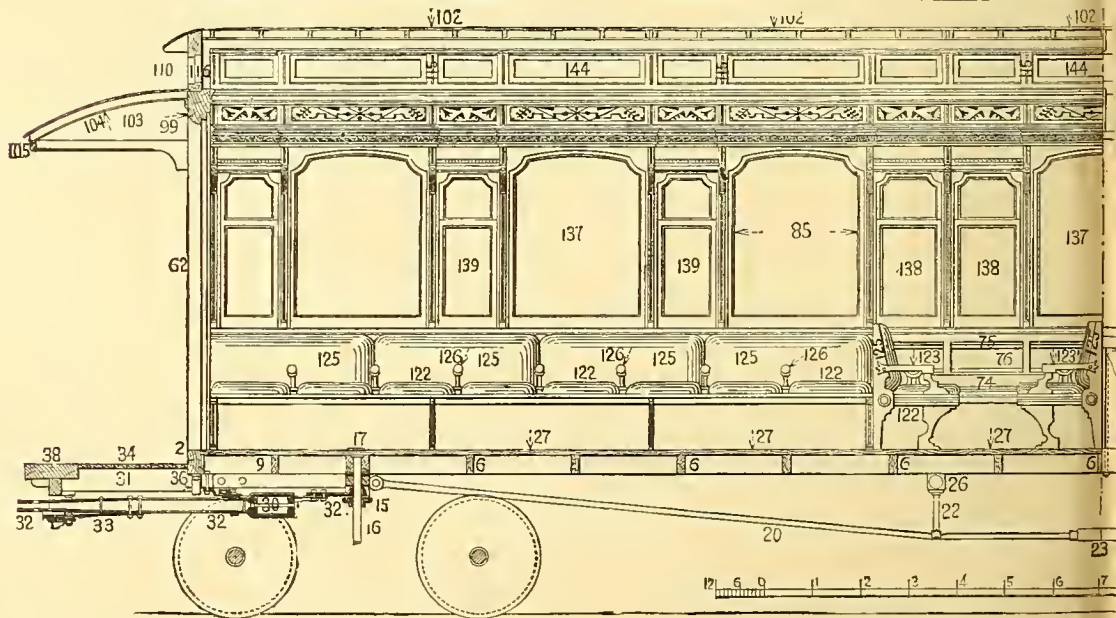


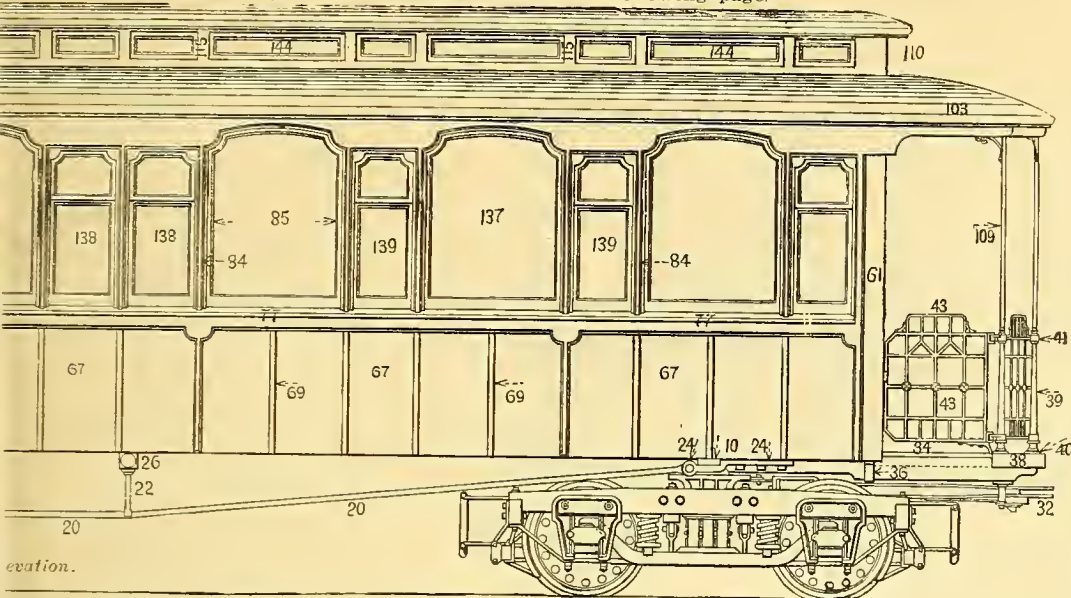
Fig. 164. Side



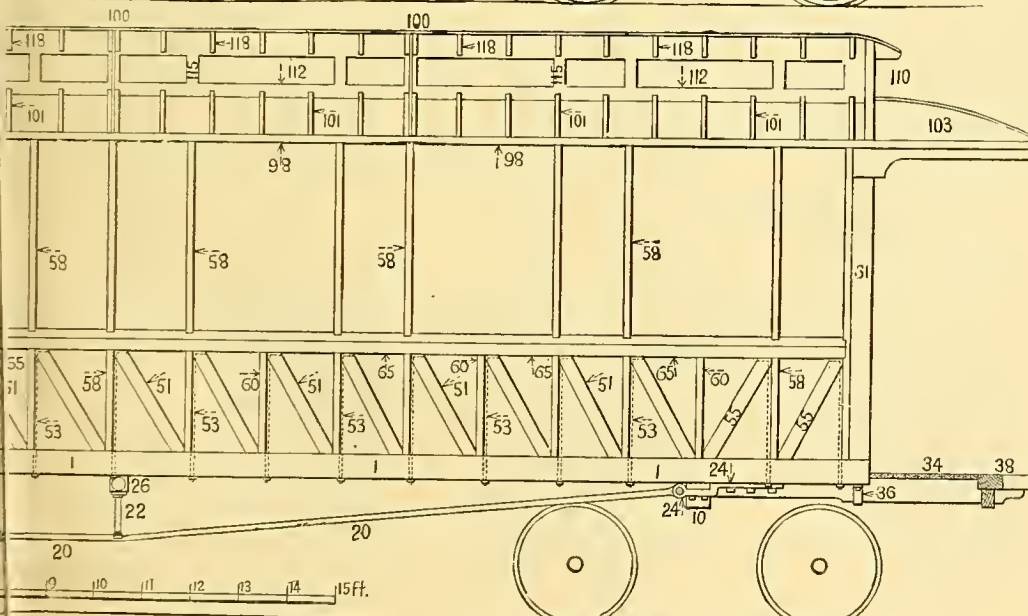
Longitudinal Section

Fig. 165. PASSENGER CAR-BODY, MANHATTAN  
(Old Standard; the new is shown)

Numbers refer to List of Names of Parts on following page.



elevation.



Side View, showing Framing.





Numbers refer to List of Names of Parts on following page

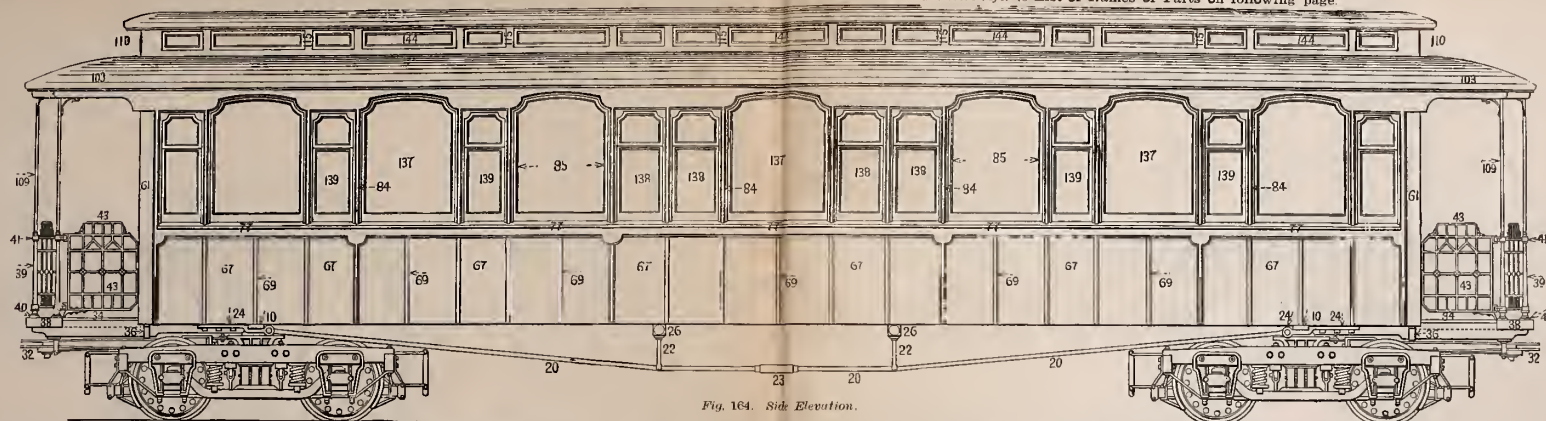
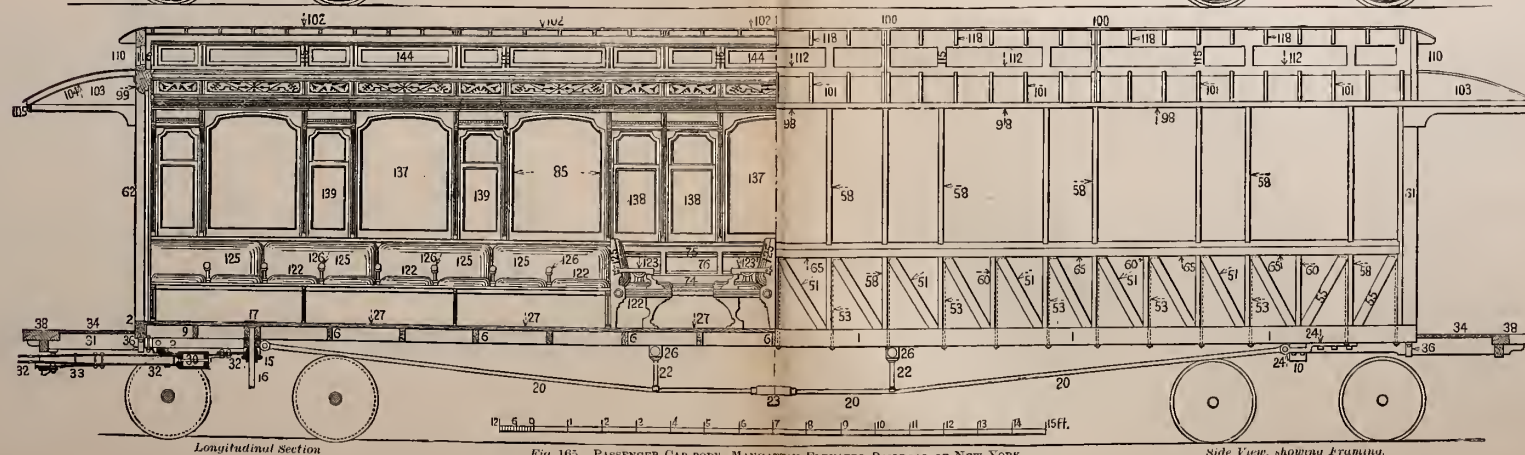


Fig. 164. Side Elevation.

Fig. 165. PASSENGER CAR-BODY, MANHATTAN ELEVATED RAILROAD OF NEW YORK.  
(Old Standard; the new is shown in Figs. 161-163.)

Side View, showing Framing.



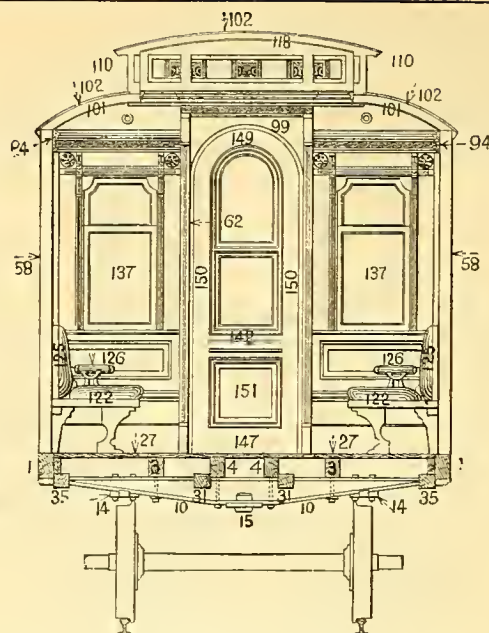
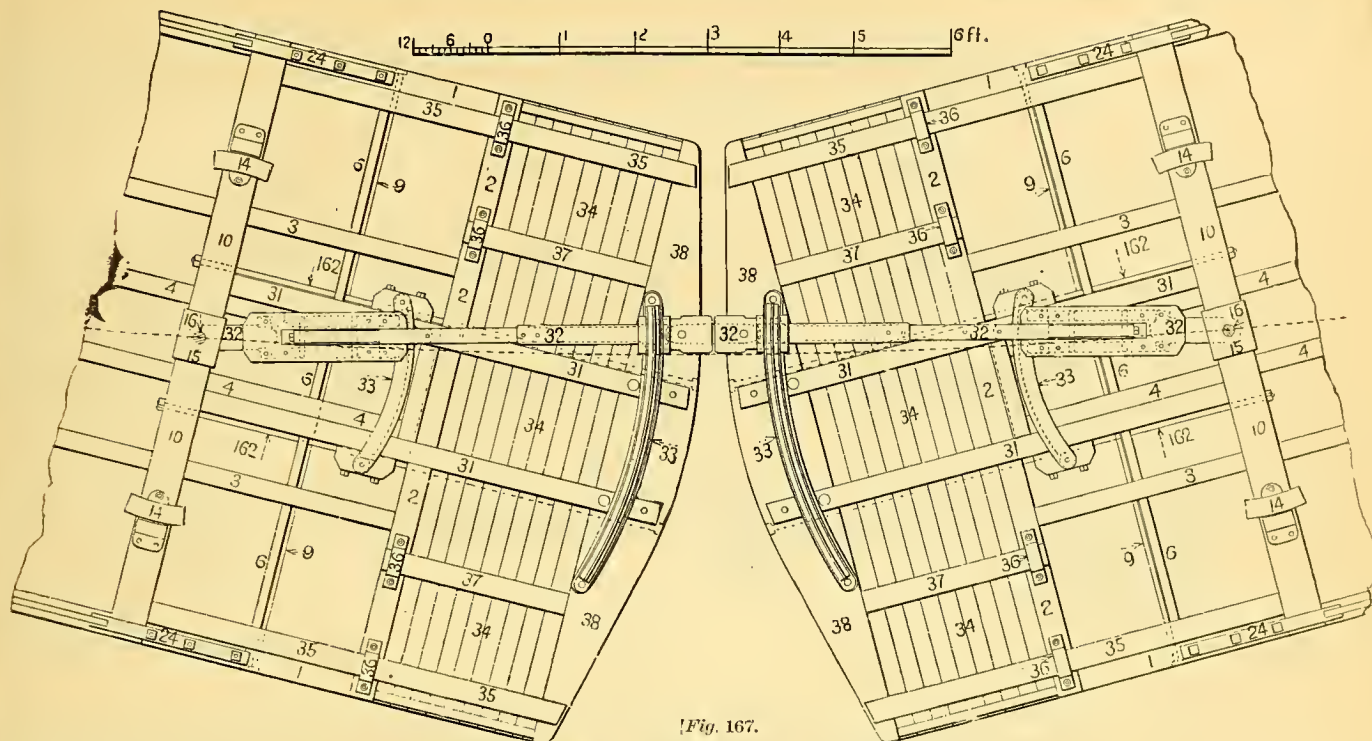


Fig. 166. Transverse Section. PASSENGER CAR-BODY MANHATTAN ELEVATED RAILROAD (Old Standard).

## NAMES OF PARTS : Figs. 164-168. PASSENGER CAR-BODY MANHATTAN ELEVATED RAILROAD.

- |  |  |                                    |                                    |
|--|--|------------------------------------|------------------------------------|
| 1. Side-sills.                             | 32. Centre-draft Drawbar.                  | 67. Outside-panel.                 | 110. Clear-story or Upper Deck.    |
| 2. End-sills.                              | 33. Drawbar Sector.                        | 69. Panel-strips.                  | 112. Deck Bottom-rail.             |
| 3. Intermediate-sills.                     | 34. Platform, Platform-floor.              | 74. Lower Wainscot-rail.           | 115. Deck Post.                    |
| 4. Centre-sills.                           | 35. Platform-sills.                        | 75. Upper Wainscot-rail.           | 116. Deck End-panel or Ventilator. |
| 6. Bridging.                               | 36. Platform-timber Clamps.                | 76. Wainscot-panel.                | 118. Upper-deck Carline.           |
| 9. Sill Tie-rod.                           | 38. Platform End-timber or Buffer-beam.    | 77. Outside Window-sill.           | 122. Car Seat. [end.               |
| 10. Body-bolster.                          | 39. Platform-post.                         | 84. Outside Window-stop.           | 123. Seat-end, or Aisle Seat.      |
| 14. Body Side-bearings.                    | 40. Base-washer for Platform-post.         | 85. Window-sash.                   | 125. Seat-back.                    |
| 15. Body Centre-plate.                     | 41. Platform-rail.                         | 94. Inside-cornice.                | 126. Seat-division.                |
| 16. King-bolt.                             | 43. Platform-gate.                         | 98. Plate.                         | 137. Window.                       |
| 17. King-bolt Plate.                       | 51. Side Body-brace.                       | 99. Door-lintel.                   | 138. Twin-window.                  |
| 20. Body Truss-rod.                        | 53. Brace Straining-rod.                   | 100. Carline, or Compound-carline. | 139. Small-window.                 |
| 22. Body Queen-post.                       | 55. Body-counter-brace.                    | 101. Rafter.                       | 144. Deck-sash, or Window.         |
| 23. Turnbuckle.                            | 58. Needle-beam or Cross-frame Tie-timber. | 102. Roof-boards.                  | 147. Bottom-rail, of Door.         |
| 24. Truss-rod Iron.                        | 60. Stud.                                  | 103. Platform-roof.                | 148. Middle Door-rail.             |
| 26. Needle-beam or Cross-frame Tie-timber. | 61. Corner-post.                           | 104. Platform-roof Carline.        | 149. Top-rail, of Door.            |
| 27. Main Floor or Car Floor.               | 62. Door-post.                             | 105. Platform-roof End-carline.    | 150. Door-stile.                   |
| 30. Draw-spring.                           | 65. Belt-rail.                             | 109. Platform-hood Post.           | 151. Door-panel.                   |
| 31. Draw-timbers.                          |  |                                    |                                    |



[Fig. 167.

Inverted Plan (on maximum curve of 90 ft. radius).

Figs. 167-168. DRAW-GEAR OF PASSENGER CAR, MANHATTAN ELEVATED RAILROAD OF NEW YORK.

NAMES OF PARTS: Figs. 167-168.

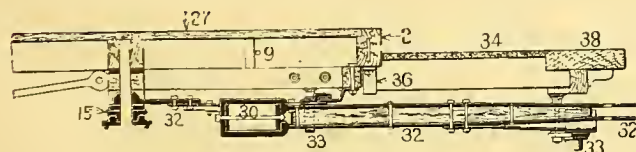


Fig. 168.

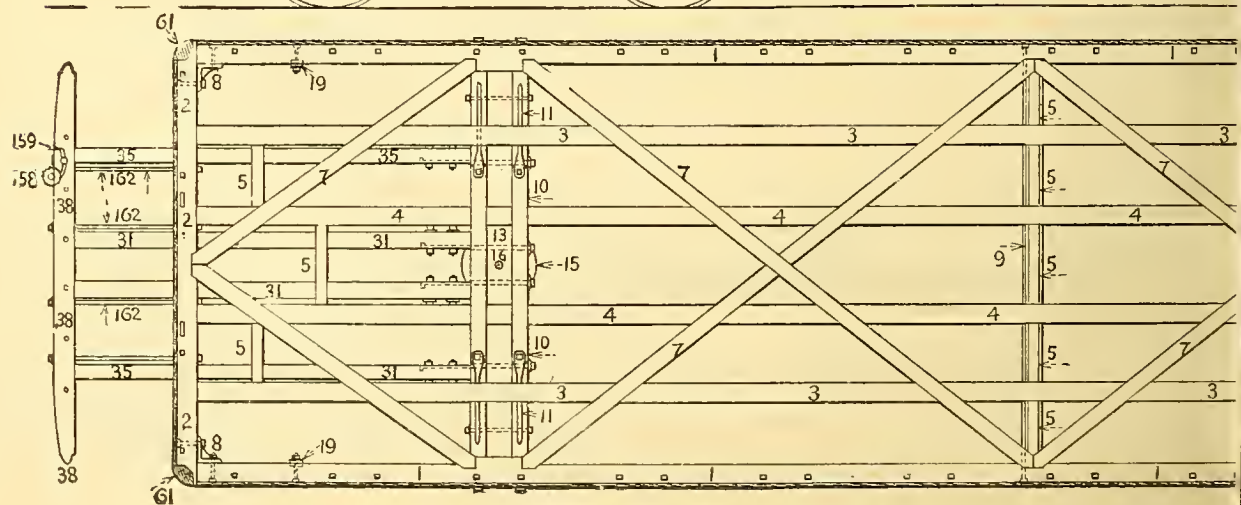
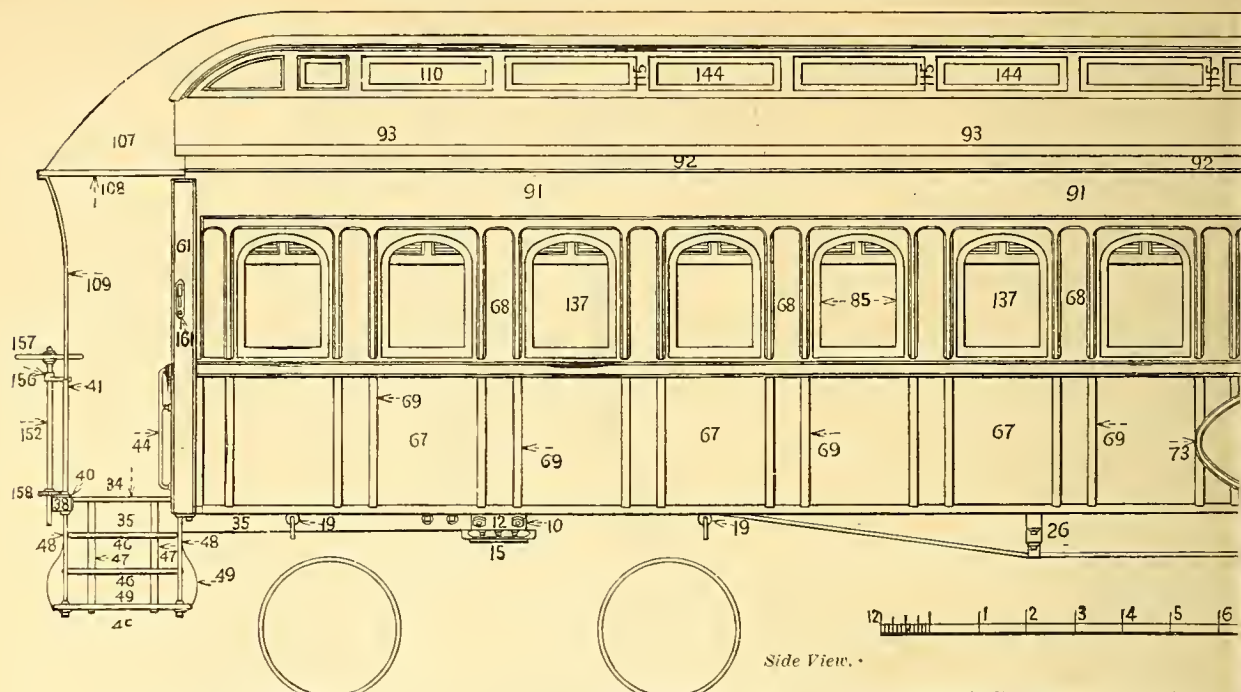
Longitudinal section of draw-bar (on tangent).

- |                               |  |
|-------------------------------|--|
| 1. Side-sills.                | 30. Draw-spring.                         |
| 2. End-sills.                 | 31. Draw-timbers.                        |
| 3. Intermediate-sills.        | 32. Centre-draft Drawbar.                |
| 4. Centre-sills.              | 33. Drawbar Sector.                      |
| 6. Bridging.                  | 34. Platform, Platform-floor.            |
| 9. Sill Tie-rod.              | 35. Platform-sills.                      |
| 10. Body-bolster.             | 36. Platform-timber Clamps.              |
| 14. Body Side-bearings.       | 37. Platform Short-sills.                |
| 15. Body Centre-plate.        | 38. Platform End-timber, or Buffer-beam. |
| 16. King-bolt.                | 162. Platform Tie-rod.                   |
| 24. Truss-rod Iron.           |  |
| 27. Main Floor, or Car Floor. |  |

(Parts numbered 32, 33 are special to this style of car, and not used elsewhere.)



Numbers refer to List of Names of Parts on following page.



Half Plan, showing Floor Framing.

PASSENGER CAR-BODY (Old Standard), PENNSYLVANIA RAILROAD







Numbers refer to List of Names of Parts on following page.

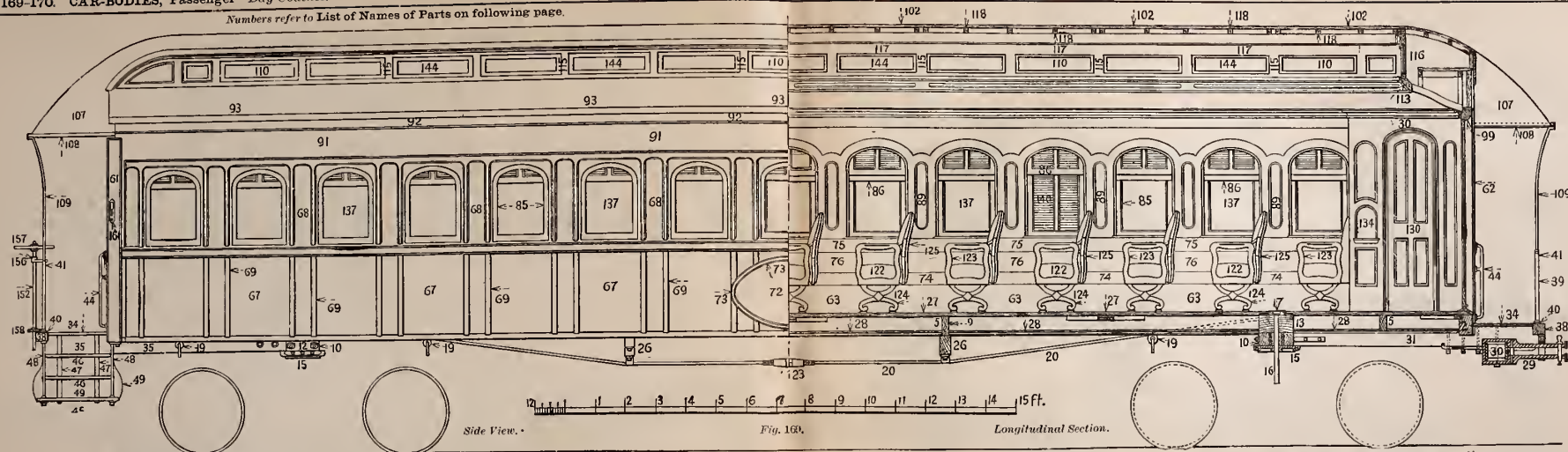
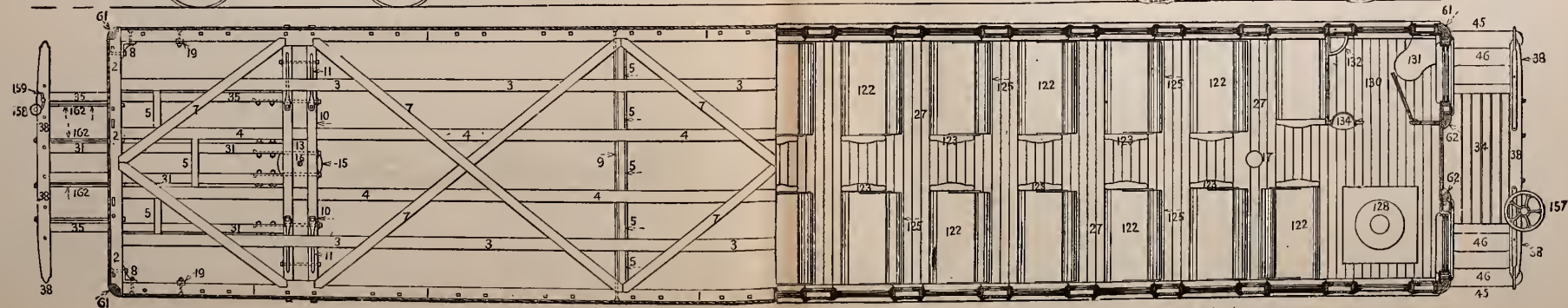


Fig. 169.

Longitudinal Section.



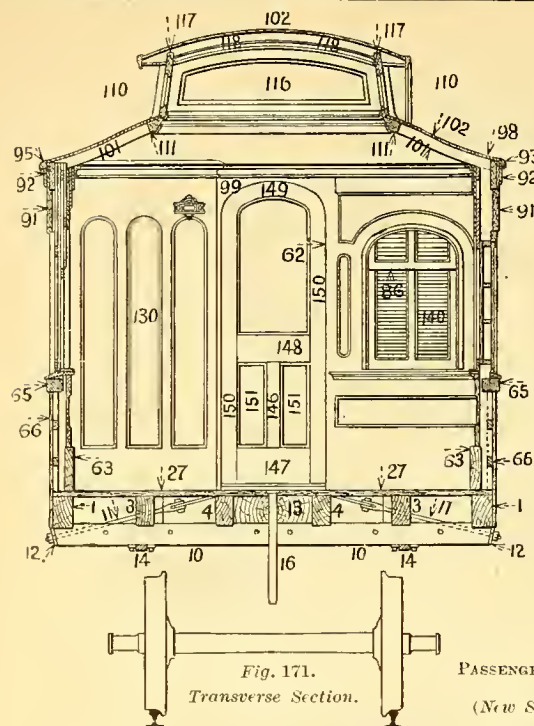
Half Plan, showing Floor Framing.

Fig. 170.

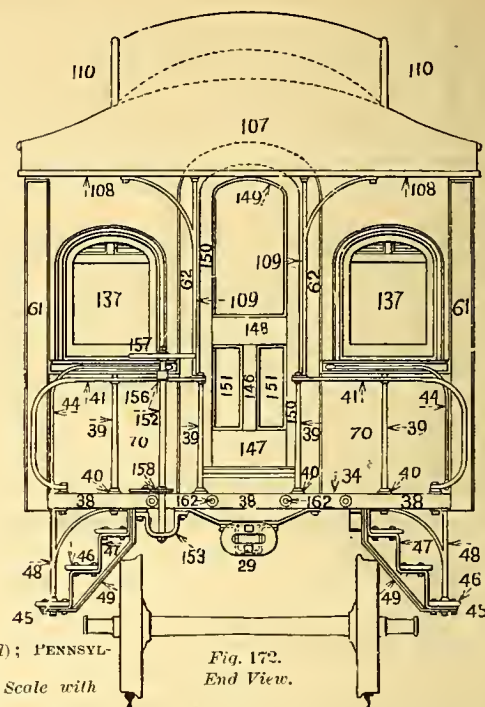
Half Plan, showing Floor, Seats, etc.

PASSENGER CAR-BODY (Old Standard), PENNSYLVANIA RAILROAD. (The present Standard is shown in Figs. 178-185.)





PASSENGER CAR-BODY (Old Standard); PENNSYLVANIA RAILROAD.  
(New Standard, Figs. 178-185.) Scale with Fig. 169.



# NAMES OF PARTS: Figs. 169-177.

- |                                    |  |                             |                           |   |
|------------------------------------|--|-----------------------------|---------------------------|---|
| 1. Side-sill.                      | 19. Body-check-chain Eye.                  | 41. Platform-rail.          | 65. Belt-rail.            | 82. Upper Belt-rail.                      |
| 2. End-sills.                      | 20. Body Truss-rod.                        | 44. Body Hand-rail.         | 66. Panel-rail.           | 83. Sash Parting-strip.                   |
| 3. Intermediate-sills.             | 23. Turnbuckle.                            | 45. Platform-steps.         | 67. Outside-panel.        | 84. Outside Window-stop.                  |
| 4. Centre-sills.                   | 26. Needle-beam or Cross-frame Tie-Timber. | 46. Tread board.            | 68. Outside Window-panel. | 85. Window-sash.                          |
| 5. Floor-timber Distance-block.    | 27. Main Floor, or Car Floor.              | 47. Step iron.              | 69. Panel-strips.         | 86. Window blind Sash.                    |
| 7. Floor-timber Braces.            | 28. Deafening-ceiling.                     | 48. Step hanger.            | 70. End-panel.            | 86'. Inside Window-stop or Window-casing. |
| 8. Sill Knee-iron.                 | 29. Drawbar.                               | 49. Splash-board.           | 72. Name-panel.           | 87. Window Core-moulding.                 |
| 9. Sill Tie-rod.                   | 30. Draw-spring.                           | 52. Side Body-brace Rod.    | 73. Name-panel Frame.     | 88. Window moulding.                      |
| 10. Body-bolster.                  | 31. Draw-timbers.                          | 54. Sill and Plate Rod.     | 74. Lower Wainscot-rail.  | 89. Inside Window-panel.                  |
| 11. Body-bolster Truss-rod.        | 34. Platform, Platform-floor.              | 56. Body-counter-brace-rod. | 75. Upper Wainscot-rail.  | 90. Window-lintel.                        |
| 12. Body-bolster Truss-rod Washer. | 35. Platform-sills.                        | 57. Brace-rod Washer.       | 76. Wainscot-panel.       | 91. Letter-board.                         |
| 13. Body-bolster Truss-block.      | 38. Platform End-timber or Buffer-beam.    | 58. Window-post.            | 77. Outside Window-sill.  | 92. Eaves Fascia-board.                   |
| 14. Body Side-bearings.            | 39. Platform-post.                         | 59. Window-panel Furring.   | 78. Inside Window-sill.   |   |
| 15. Body Centre-plate.             | 40. Base-washer for Platform post.         | 60. Stud.                   | 79. Window-sill Cap.      |   |
| 16. King-bolt.                     |  | 61. Corner-post.            | 80. Window-sill Moulding. |   |
| 17. King-bolt Plate.               |  | 62. Door-post.              | 81. Belt-rail Cap.        |   |
|                                    |  | 63. Truss-plank.            |                           |   |
|                                    |  | 64. Truss-plank Cap.        |                           |   |

(Continued on following page.)

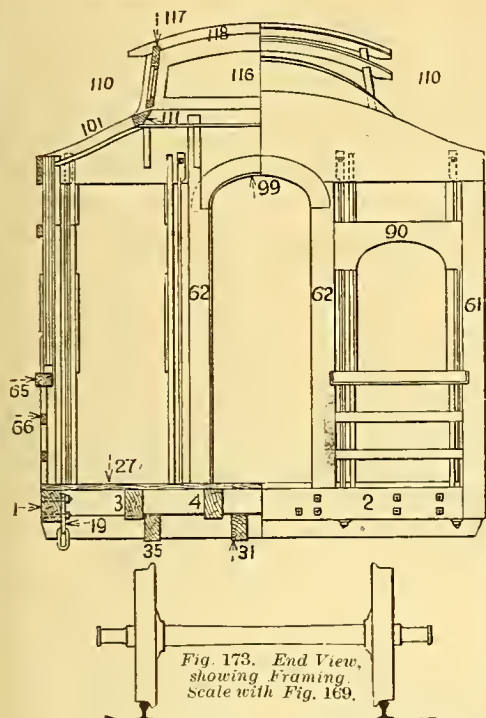


Fig. 173. End View,  
showing Framing.  
Scale with Fig. 169.

PASSENGER CAR-BODY  
(Old Standard)  
PENNSYLVANIA RAILROAD.  
(New Standard, Figs. 178-185).

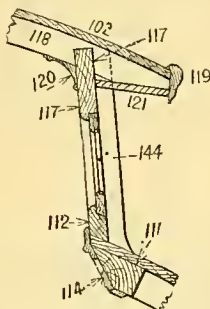


Fig. 174.  
Section of Side of Clear-story.

(A section of the new standard passenger car superseding this design is shown in Fig. 180. Also, one showing a different style of construction, with Challender Truss and Wilson Flexible Window Blind, in Figs. 185a and 185b.)

LIST OF NAMES OF PARTS: Figs. 169-177.

(Continued from preceding page.)

- |                                      |                                    |                                 |
|--------------------------------------|------------------------------------|---------------------------------|
| 93. Eaves-moulding.                  | 112. Deck Bottom-rail.             | 132. Urinal.                    |
| 94. Inside-cornice.                  | 113. Deck End-sill.                | 134. Water-alcove.              |
| 95. Inside-cornice Fascia-board.     | 114. Deck-sill Facing.             | 137. Window.                    |
| 96. Inside-cornice Sub-fascia-board. | 115. Deck Post.                    | 140. Window-blind.              |
| 97. Inside lining.                   | 116. Deck End-panel or Ventilator. | 144. Deck-sash, or Window.      |
| 98. Plate.                           | 117. Deck-plate.                   | 146. Door-mullion.              |
| 99. Door-lintel.                     | 118. Upper-deck Car-line.          | 147. Bottom-rail, of Door.      |
| 100. Carline, or Compound-carline.   | 119. Upper-deck Eaves Moulding.    | 148. Middle Door-rail.          |
| 101. Rafter.                         | 120. Deck Inside Cornice.          | 149. Top-rail, of Door.         |
| 102. Roof-boards.                    | 121. Deck Soffit-board.            | 150. Door-sole.                 |
| 107. Platform-hood.                  | 122. Car Seat.                     | 151. Door-panel.                |
| 108. Platform-hood Bow.              | 123. Seat-end, or Aisle Seat-end.  | 152. Brake-shaft.               |
| 109. Platform-hood Post.             | 124. Seat-stand.                   | 153. Brake-shaft Step.          |
| 110. Clear-story or Upper Deck.      | 125. Seat back.                    | 156. Upper Brake-shaft Bearing. |
| 111. Deck Sill.                      | 128. Stove, or Heater.             | 157. Brake-wheel.               |
|                                      | 130. Saloon.                       | 158. Brake Ratchet-wheel.       |
|                                      | 131. Closet Hopper.                | 161. Flag-holder Plate.         |
|                                      |                                    | 162. Platform Tie-rod.          |

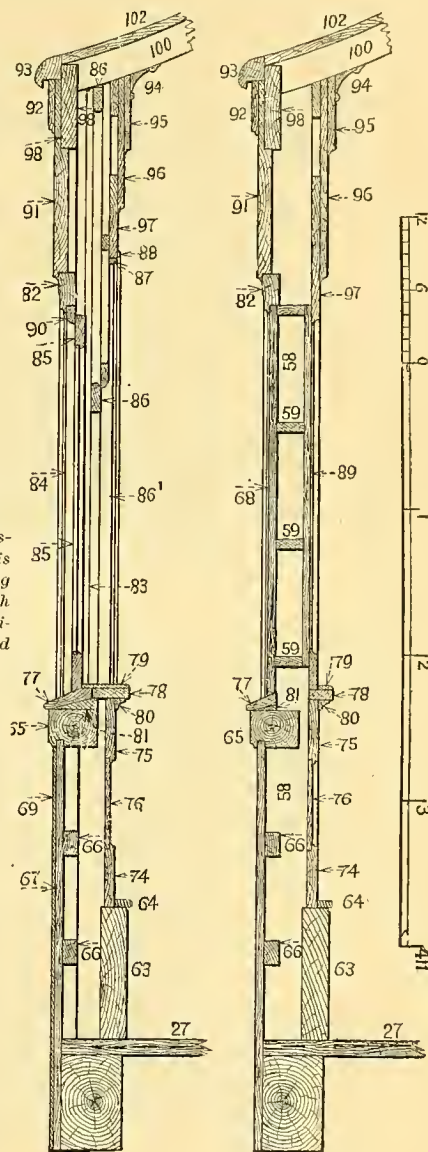
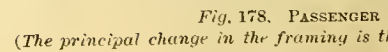


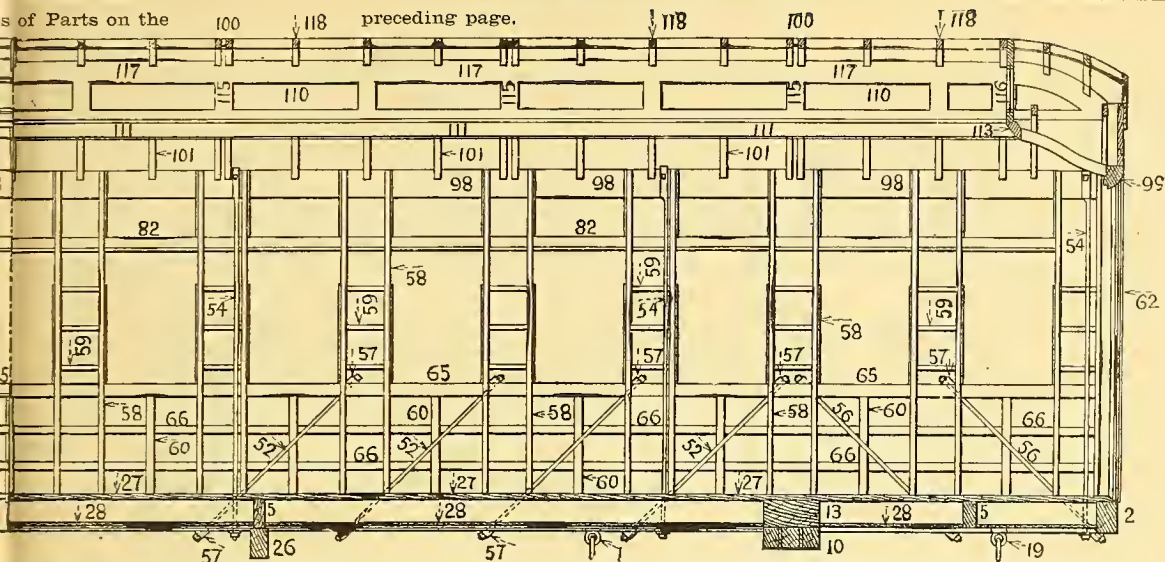
Fig. 175.  
Section of Side  
through Window.

Fig. 176.  
Section of Side  
between Windows.

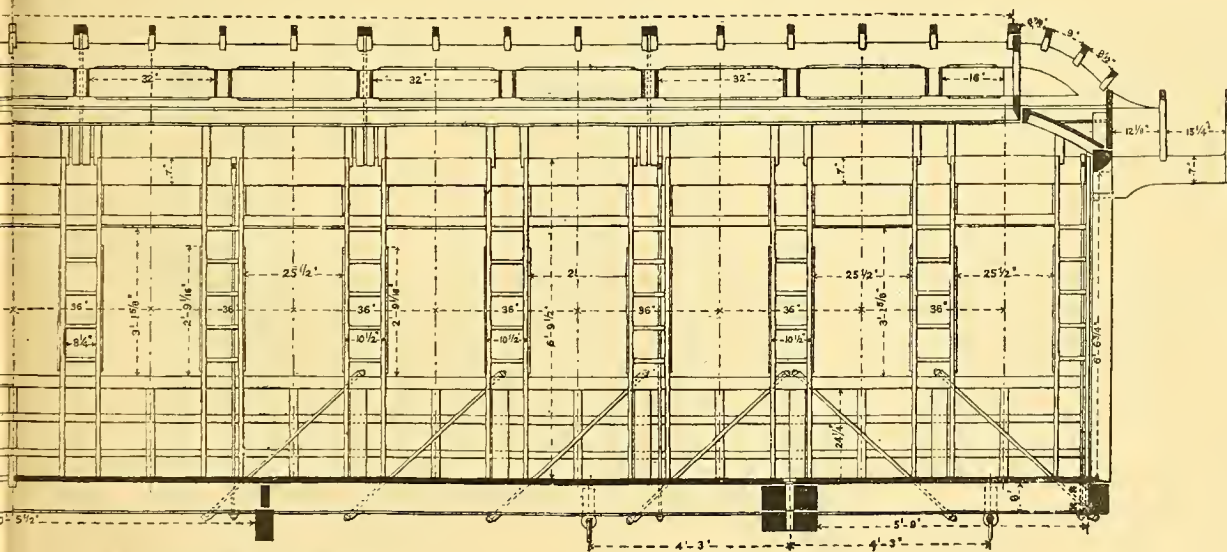




s of Parts on the 100 118 preceding page.



Id Standard), PENNSYLVANIA RAILROAD.  
(with Fig. 169.)



ODY (*New Standard*). PENNSYLVANIA RAILROAD.

*stitution of a PLATFORM-ROOF for a PLATFORM-HOOD. See Dictionary.)*

*Longitudinal Section, showing Framing*





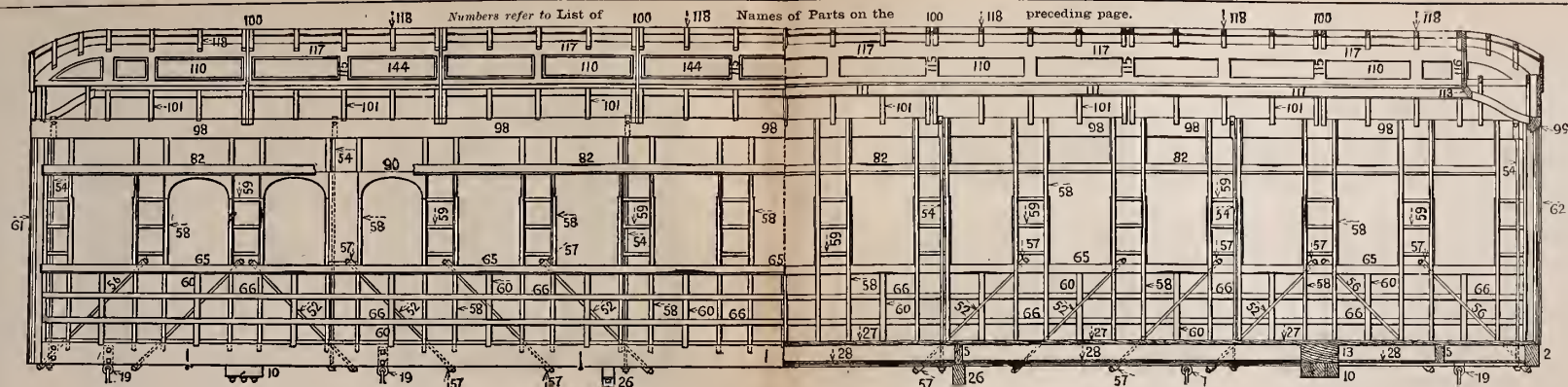
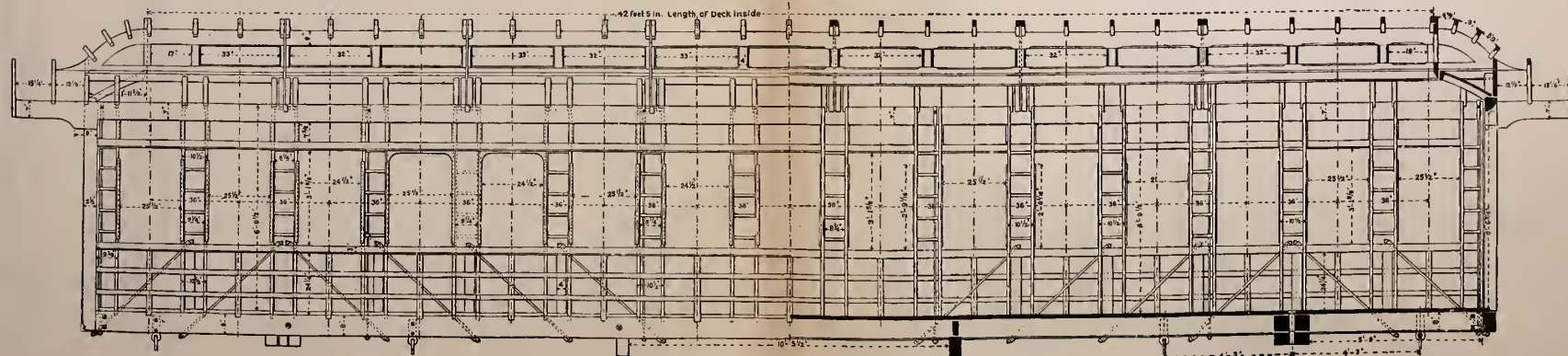


Fig. 177. PASSENGER CAR-BODY (Old Standard), PENNSYLVANIA RAILROAD.  
(Scale with Fig. 169.)



Side Elevation of Framing.

Fig. 178. PASSENGER CAR-BODY (New Standard), PENNSYLVANIA RAILROAD.  
(The principal change in the framing is the substitution of a PLATFORM-ROOF for a PLATFORM-HOOD. See Dictionary.)

Longitudinal Section, showing Framing

PASSENGER CAR-BODY

(New Standard),

PENNSYLVANIA RAILROAD.

(Old Standard, Figs. 169-177.)

Weight, 42,000 lbs.

Capacity, 52 passengers.

NAMES OF PARTS; Figs. 119-180.

1. Side sills.
3. Intermediate-sills.
4. Centre-sills.
10. Body-bolster.
27. Main Floor, or Car Floor.
58. Window post.
62. Door-post.
63. Truss-plank.
65. Belt-rail.
66. Panel rail.
67. Outside panel.
69. Panel strips (Fig. 175).
74. Lower Wainscot-rail.
75. Upper Wainscot-rail.
76. Wainscot-panel.
77. Outside Window sill.
78. Inside Window-sill.
79. Window sill Cap.
80. Window-sill Belt Moulding.
81. Belt-rail Cap.
82. Upper Belt-rail.
83. Sash Parting-strip.
84. Outside Window-stop.
85. Window-sash.
86. Window-blind Sash (lower and upper).
- 86'. Inside Window-stop, or Window-easing.
88. Window-moulding.
89. Inside Window-panel.
90. Window-lintel.
91. Letter-board.

(Continued on following page.)

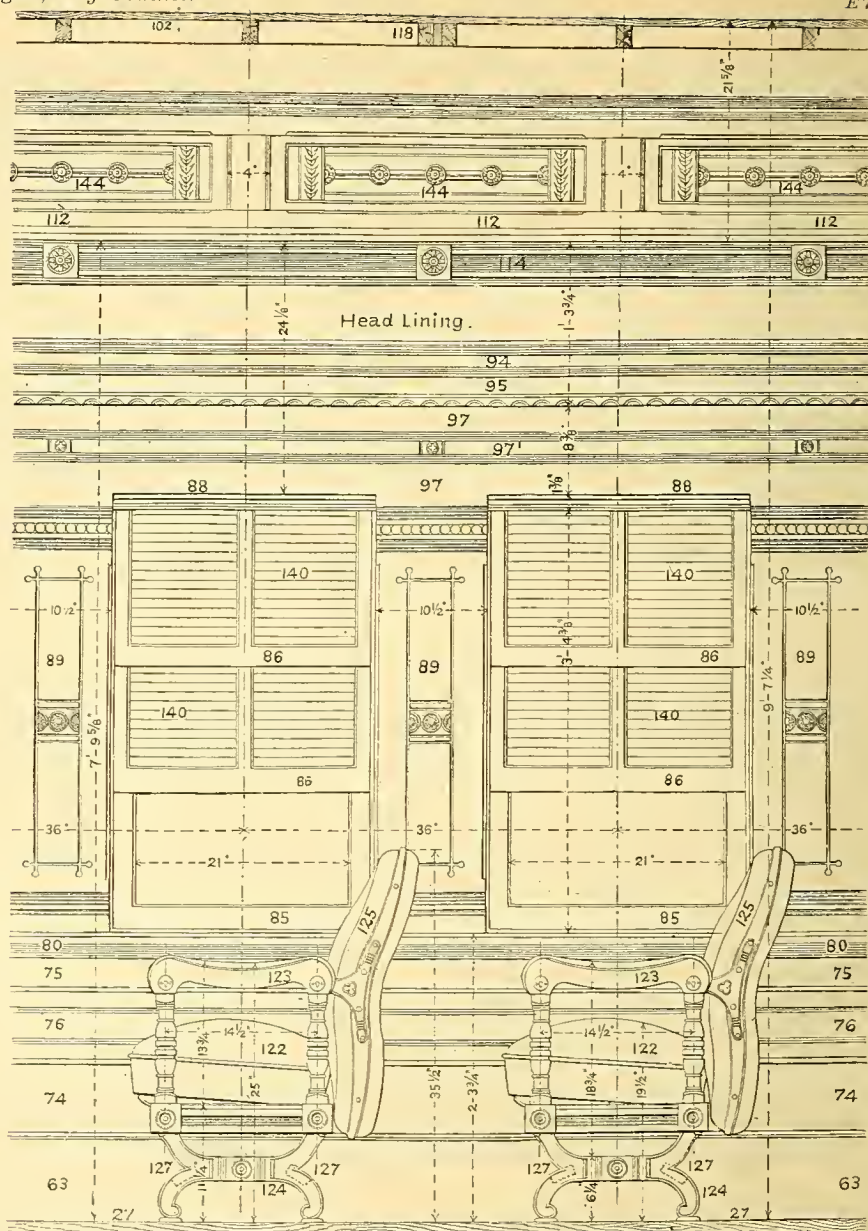


Fig. 179. Inside Side Elevation.



PASSENGER CAR-BODY  
(New Standard),  
PENNSYLVANIA RAILROAD.  
(Old Standard, Figs. 169-171.)

LIST OF NAMES OF PARTS; Figs. 179-180.

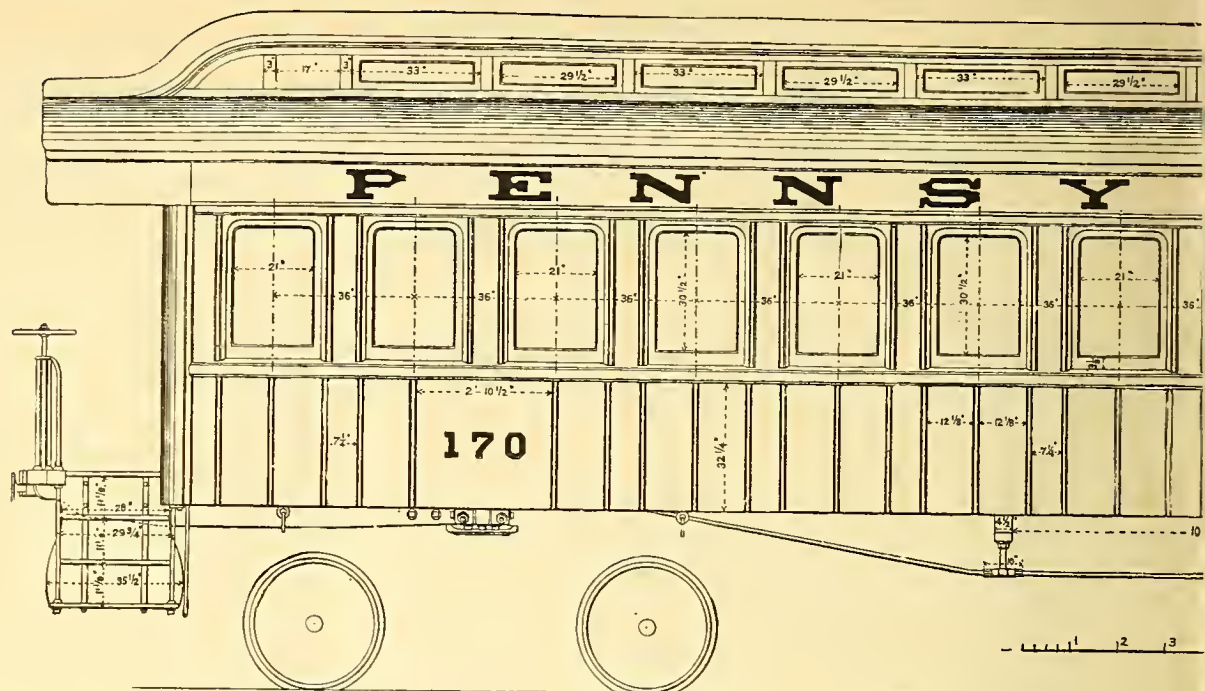
(Continued from preceding page.)

- 92. Eaves Fascia-board.
- 93. Eaves-moulding.
- 94. Inside-cornice.
- 95. Inside cornice Fascia-board.
- 97. Inside-lining.
- 97'. Belt-moulding.
- 98. Plate.
- 100. Carline, or Compound Carline.
- 102. Roof-boards.
- 110. Clear-story, or Upper Deck
- 111. Deck Sill.
- 112. Deck Bottom-rail.
- 114. Deck-sill Facing.
- 117. Deck Plate.
- 118. Upper-deck Carline.
- 119. Upper-deck Eaves-moulding.
- 120. Deck Inside-cornice.
- 121. Deck Soffit board.
- 122. Car Seat.
- 123. Seat-end, or Aisle Seat-end.
- 124. Seat-stand.
- 125. Seat-back.
- 127. Foot-rest.
- 137. Window.
- 140. Window blind (lower and upper).
- 144. Deck Sash, or Window.
- 147. Bottom-rail, of Door.
- 148. Middle Door-rail.
- 149. Top-rail, of Door.
- 150. Door-stile.
- 151. Door-panel.

(A different style of construction, with Challender Truss and Wilson Flexible Window Blinds, is shown in Figs. 185a and 185b. See, also, section of side of old Pennsylvania standard, Figs. 175-6.)

Fig. 180. Section and Inside End Elevation.





Side Elevation.

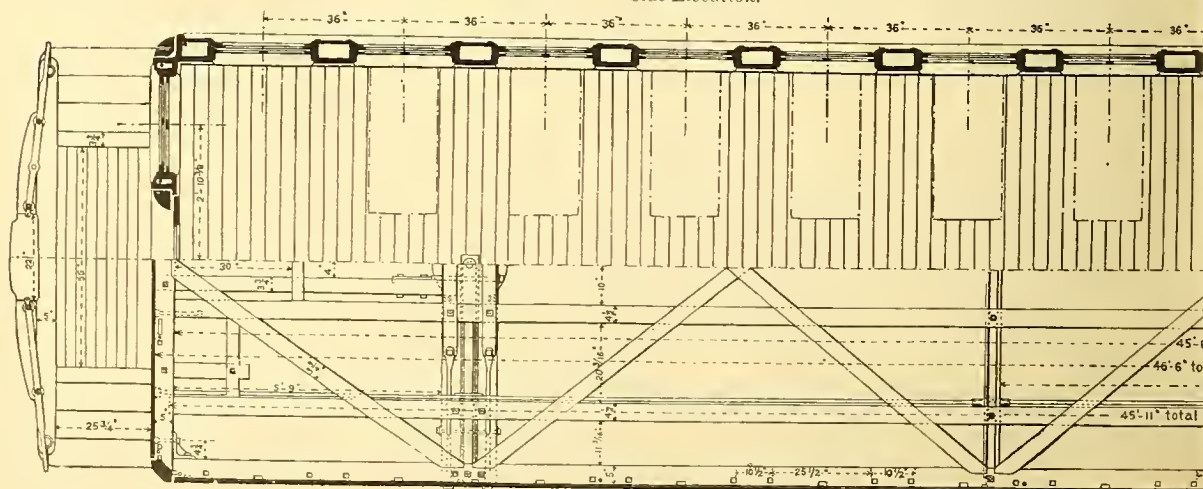


Fig.

STANDARD PASSENGER CAR-BODY  
(Old Standard, with detailed references to Names of Parts, Figs. 169-177. Fo

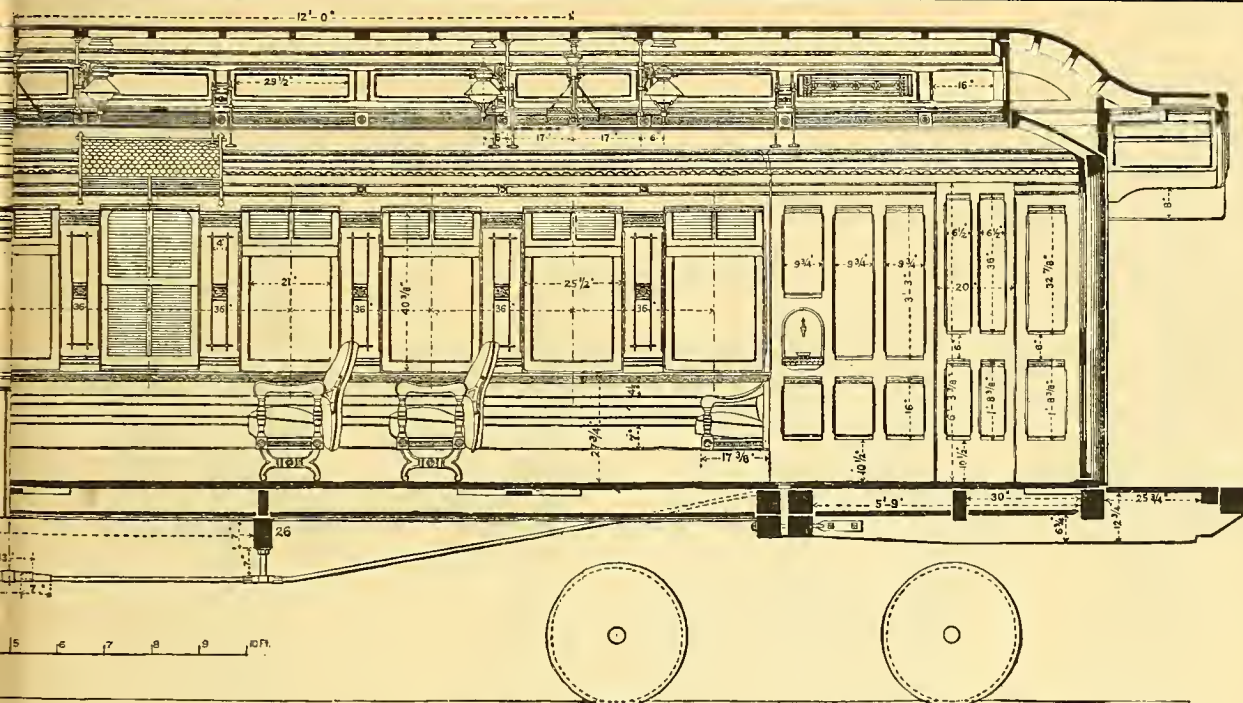
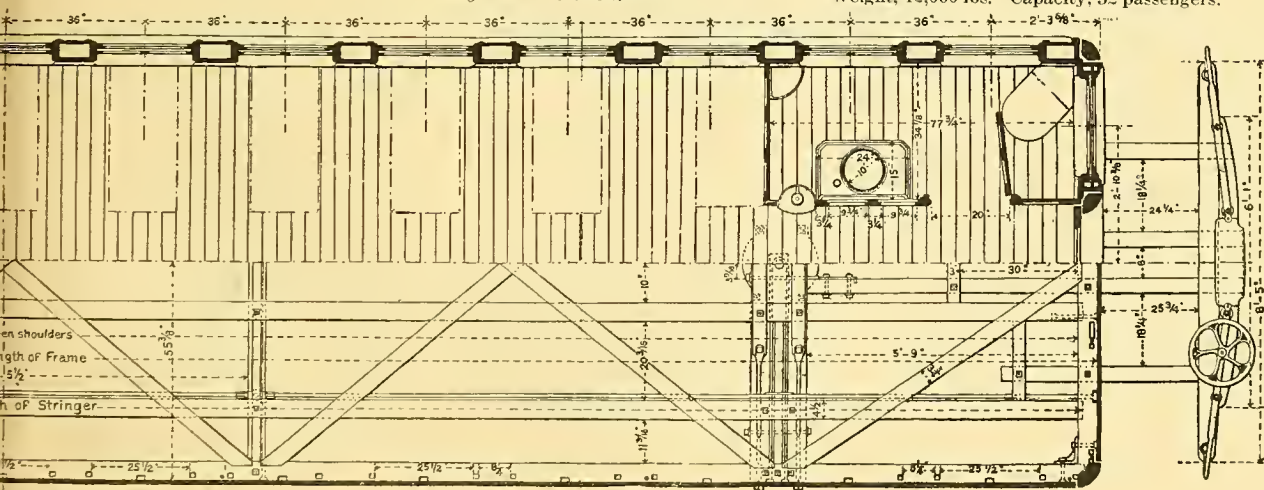


Fig. 181.

Longitudinal Section.

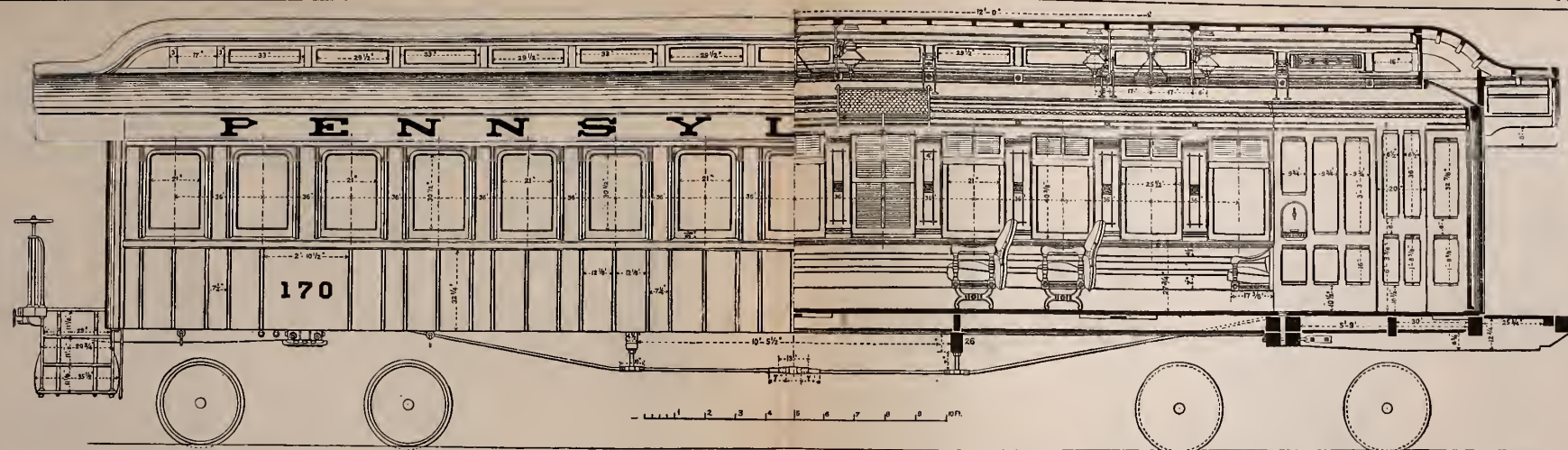
Weight, 42,000 lbs. Capacity, 52 passengers.



Plan.  
 in Standard, PENNSYLVANIA RAILROAD.  
 For other engravings of the details of this car, see CAR-BODY DETAILS and FURNISHINGS.)







Side Elevation.

Fig. 181.

Longitudinal Section.

Weight, 42,000 lbs. Capacity, 52 passengers.

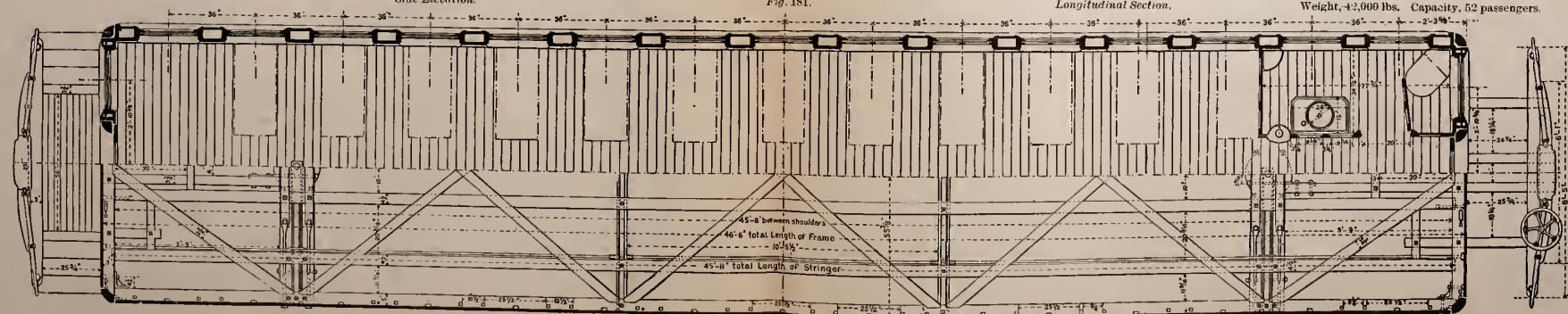


Fig. 182. Plan.

STANDARD PASSENGER CAR-BODY (Non Standard), PENNSYLVANIA RAILROAD.  
(Old Standard, with detailed references to Names of Parts, Figs. 163-177. For further engravings of the details of this car, see CAR-BODY DETAILS and FURNISHINGS.)

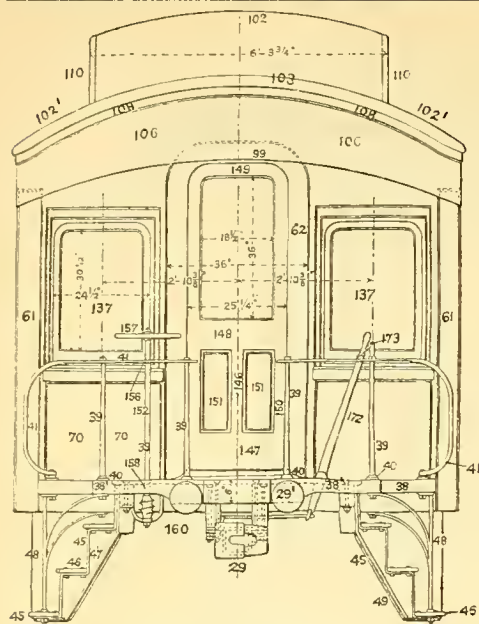


Fig. 183. End Elevation.

Scale with Fig. 181.

PASSENGER CAR-BODY  
(New Standard),  
PENNSYLVANIA RAILROAD.  
(Old Standard, Figs. 169-177.) Cross-section through  
Window.

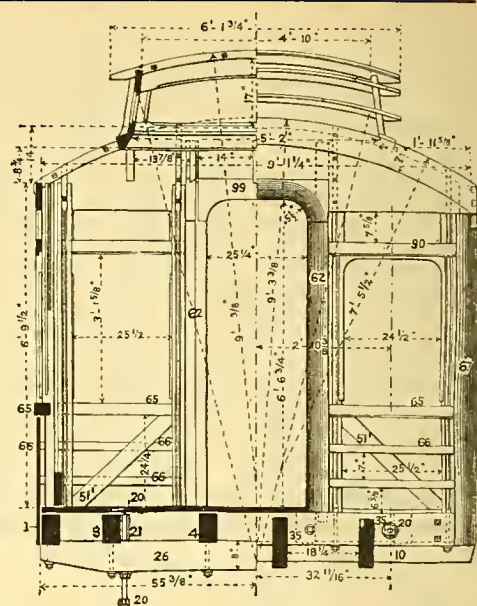


Fig. 184.  
Cross-section through  
Platform.

NAMES OF PARTS: Figs. 183-185.

- |                              |                            |                            |                             |
|------------------------------|----------------------------|----------------------------|-----------------------------|
| 1. Side-sills.               | 39. Platform-post.         | 92. Eaves Fascia-board.    | 137. Window.                |
| 2. End-sills.                | 40. Base-washer, for Plat- | 93. Eaves-moulding.        | 140. Window-blind.          |
| 3. Intermediate-sills.       | form-post.                 | 95. Inside-cornice Fascia- | 146. Door-mullion.          |
| 4. Centre-sills.             | 41. Platform-rail.         | board.                     | 147. Bottom-rail, of Door.  |
| 10. Body-bolster.            | 45. Platform-steps.        | 98. Plate.                 | 148. Middle Door-rail.      |
| 11. Body-bolster Truss-rod.  | 46. Tread-board.           | 101. Rafter.               | 149. Top-rail, of Door.     |
| 12. Body-bolster Truss-rod   | 47. Step-iron.             | 102. Roof-boards (Upper    | 150. Door-stile.            |
| Washer.                      | 48. Step-hanger.           | Deck).                     | 151. Door-panel.            |
| 14. Body Side-bearings.      | 49. Splash board.          | 102'. Roof-boards (Lower   | 152. Brake-shaft.           |
| 16. King-bolt or Centre-pin. | 51. Side Body-brace.       | Deck).                     | 156. Upper Brake-shaft      |
| 20. Body Truss-rod.          | 51'. End Body-brace.       | 103. Platform-roof.        | Bearing.                    |
| 21. Body Truss-rod Saddle.   | 61. Corner-post.           | 106. Roof-apron.           | 157. Brake-wheel.           |
| 26. Needle-beam or Cross-    | 62. Door-post.             | 108. Platform-hood Bow.    | 158. Brake Ratchet-wheel.   |
| frame Tie-timber.            | 63. Truss-plank.           | 110. Clear-story or Upper  | 160. Brake-chain Worm.      |
| 27. Main Floor, or Car       | 65. Belt-rail.             | Deck.                      | 172. Coupling-lever.        |
| Floor.                       | 66. Panel rail.            | 111. Deck Sill.            | 173. Coupling-ring.         |
| 29. Drawbar (Janney).        | 70. End-panel.             | 116. Deck End-panel or     | 208. Body-bolster Truss and |
| 29'. Buffer (Janney).        | 86. Window-blind Sash      | Ventilator.                | Block.                      |
| 35. Platform Sills.          | (lower and upper).         | 117. Deck Plate.           |                             |
| 38. Platform End-timber or   | 90. Window-lintel.         | 118. Upper-deck Carline.   |                             |
| Buffer Beam.                 | 91. Letter-board.          | 130. Saloon.               |                             |

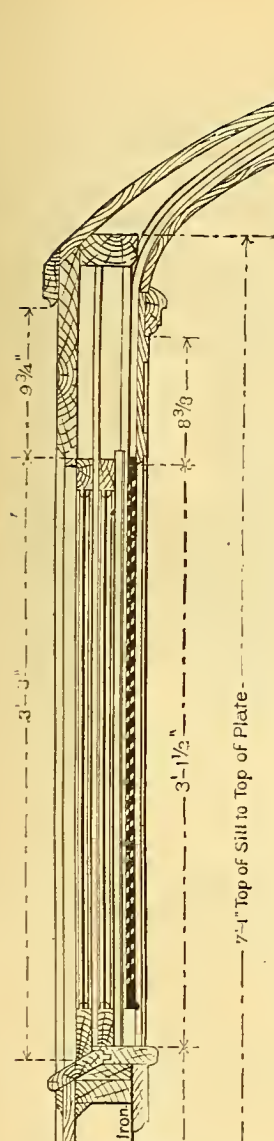


Fig. 185a.

WILSON FLEXIBLE WINDOW-BLIND (also shown in detail in Figs. 1646-7.)

Numbers refer to List of Names of Parts on previous page.

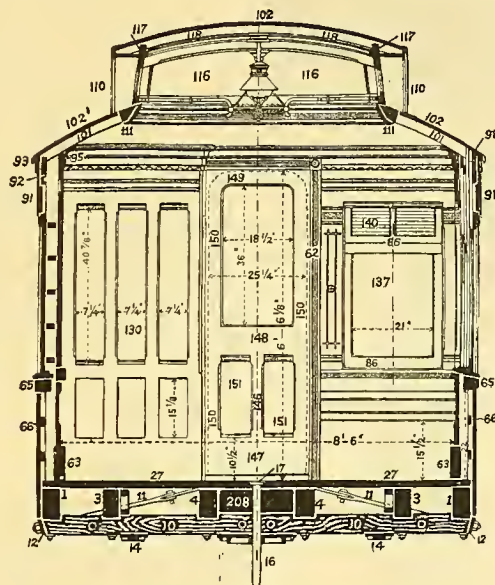


Fig. 185.

Transverse Section and Interior End View,  
PASSENGER CAR-BODY (New Standard) PENNSYLVANIA  
RAILROAD.

Figs. 185a and b.

CROSS-SECTIONS OF SIDE OF DINING CAR "KANSAS CITY"  
(shown in Plan and Elevation, with other details in Figs.  
191-194), showing WILSON FLEXIBLE WINDOW-BLIND AND  
CHALLENGER TRUSS.

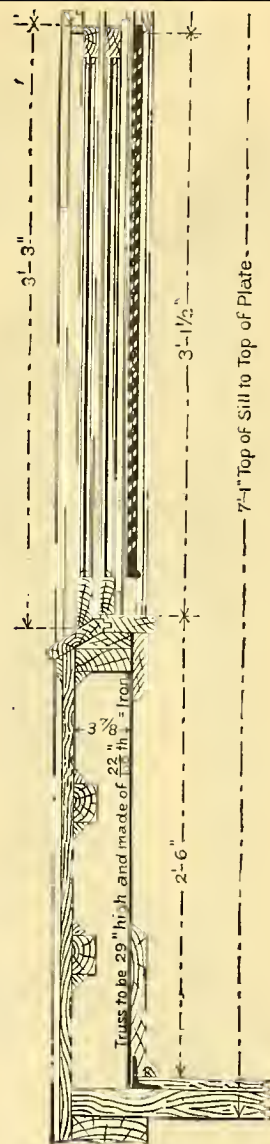


Fig. 185b.

CHALLENGER TRUSS.



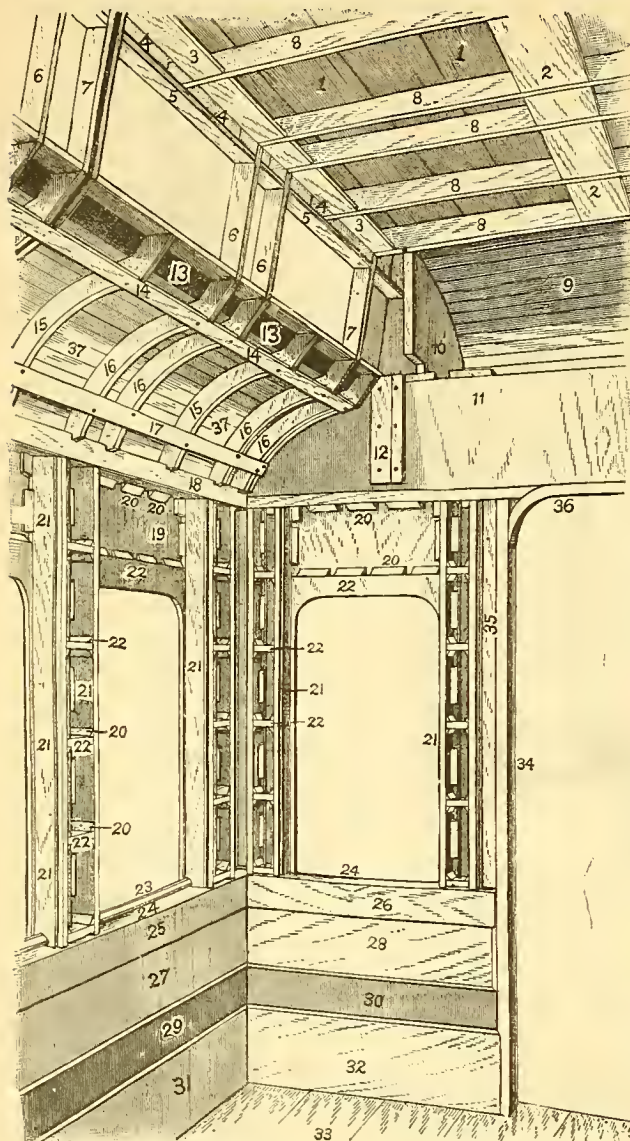


Fig. 186. Perspective View of Interior.  
PASSENGER-CAR FRAMING, FITCHBURG RAILROAD

### NAMES OF PARTS, Fig. 186.

(Numbers in parentheses refer to corresponding parts in Figs. 154-185, notably Figs. 175-180.)

1. Roof-boards, Upper Deck.
2. } Deck Bridging.
3. }
4. (117) Deck Plate.
5. Deck-sash Lintel.
6. (15) Deck sash Post.
7. Compound Carlin.
8. Upper deck Carlin.
9. Platform-hood Ceiling.
10. Platform-hood Side-piece.
11. End Roof-panel.
12. Furring-blocks.
13. (112) Lower Deck-rail.
14. Roof-strip (upper).
15. } (101) Rafter.
16. }
17. Roof-strip (lower).
18. (98) Plate.
19. (91) Lettler-board.
20. Blocking.
21. (58) Window Post.
22. (85) Window-panel Furring.
23. (79) Window-sill Cap.
24. (78) Inside Window-sill.
25. (75) Upper Wainscot-rail.
26. Upper Wainscot End-rail.
27. (76) Wainscot Panel.
28. End Wainscot-panel.
29. (74) Lower Wainscot-rail.
30. Lower Wainscot End-rail.
31. (63) Truss-plank.
32. End Truss-plank.
33. (27) Floor.
34. (2) Door-post.
35. Door-post Filling-piece.
36. (99) Door Lintel.
37. Roof-boards Lower Deck.

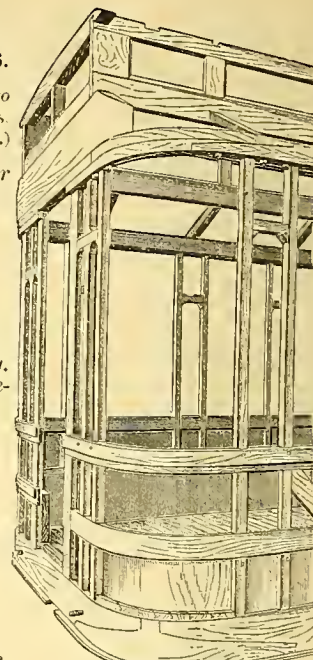


Fig. 187.

Perspective View of Framing.

ROUND-CORNERED PASSENGER CAR,  
PHILADELPHIA & READING RAIL-  
ROAD.

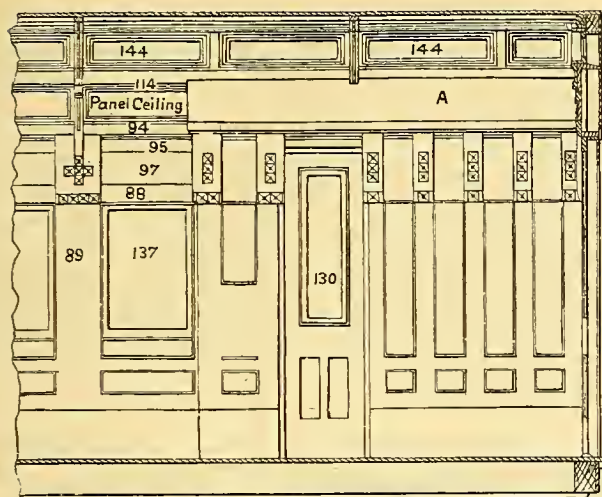


Fig. 188. Side View of interior finish near Saloon.

ROUND-CORNERED  
PASSENGER CAR,  
PHILADELPHIA & READING  
RAILROAD ; with  
"A" ROOF.

(A side and  
end Eleva-  
tion, with  
suspended  
heater, are  
shown in  
Figs. 1529-  
1530.)

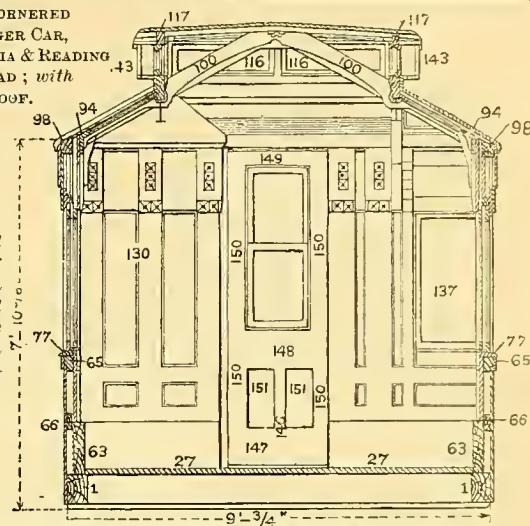


Fig. 189. Transverse Section, giving Interior End Elevation.

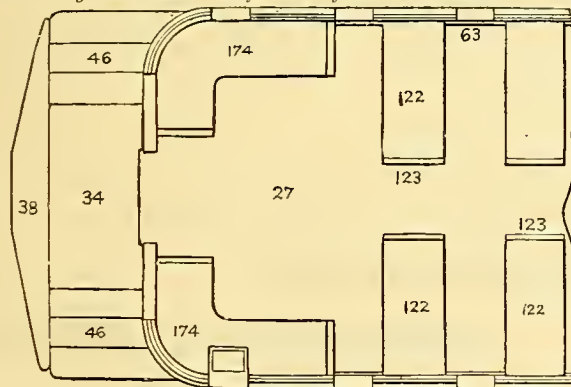


Fig. 190. Plan.

1' 2' 3' 4' 5' 6' 7' 8' 9' 10 Ft.

NAMES OF PARTS ; Figs. 187-190.

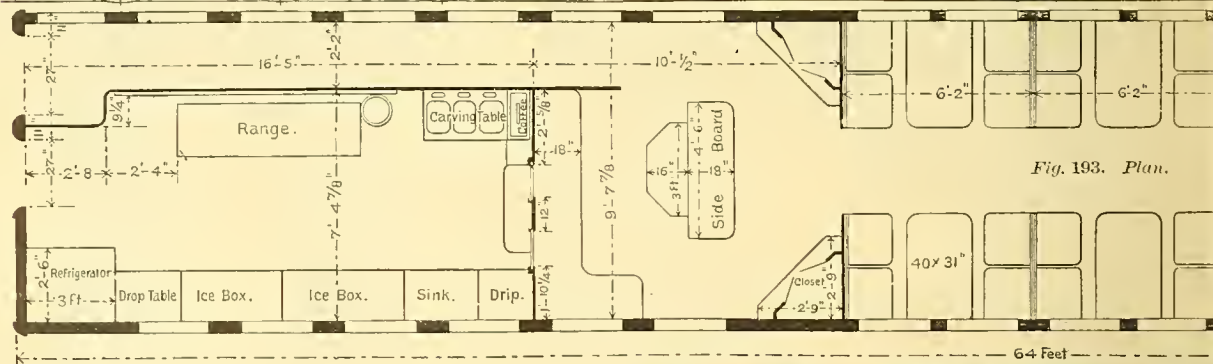
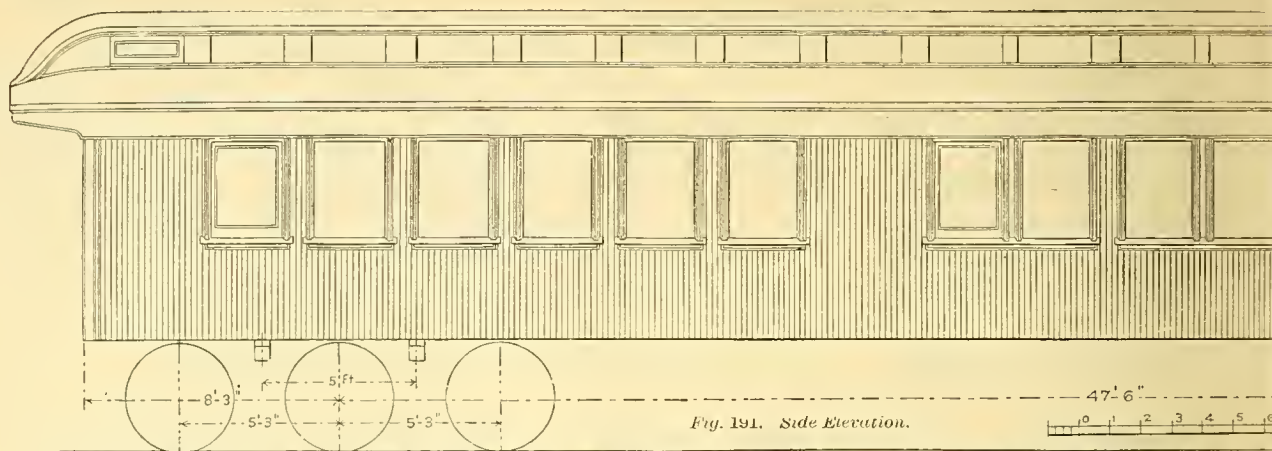
**A. Saloon Roof.**

- 1. Side sills.
- 27. Main Floor, or Car Floor.
- 34. Platform, Platform-floor.
- 38. Platform End-timber, or Buffer-beam.
- 46. Tread-board.
- 63. Truss-plank.
- 65. Belt-rail.
- 66. Panel-rail.
- 77. Outside Window-sill.

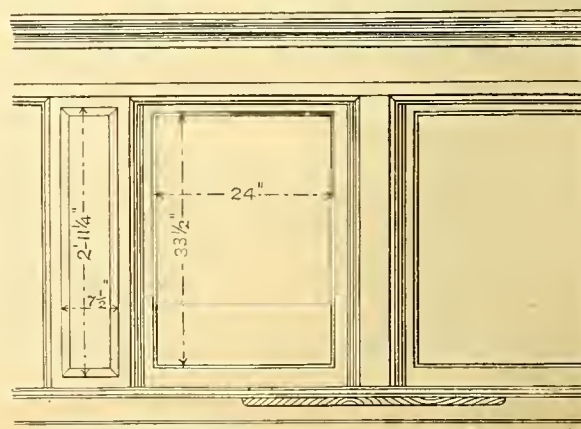
- 88. Window-moulding.
- 89. Inside Window-panel.
- 94. Inside-cornice.
- 95. Inside-cornice Fascia-board.
- 97. Inside-lining.
- 98. Plate.
- 100. Carline, or Compound-carline.
- 114. Deck-sill Facing.

- 116. Deck End-panel, or Ventilator.
- 117. Deck plate.
- 122. Car-seat.
- 123. Seat-end, or Aisle Seat-end.
- 130. Saloon.
- 131. Closet Hopper.
- 132. Urinal.
- 133. Water-cooler.

- 137. Window.
- 143. Deck Side Ventilator.
- 146. Door-mullion.
- 147. Bottom-rail, of Door.
- 148. Middle Door-rail.
- 149. Top-rail, of Door.
- 150. Door-stile.
- 151. Door-panel.
- 174. Round-corner Seat.
- 175. Wash-basin.



(The ground plan of a dining car differing in detail from the above is shown in Fig. 214, Dining Car on Chicago, Milwaukee & St. Paul Railway.)





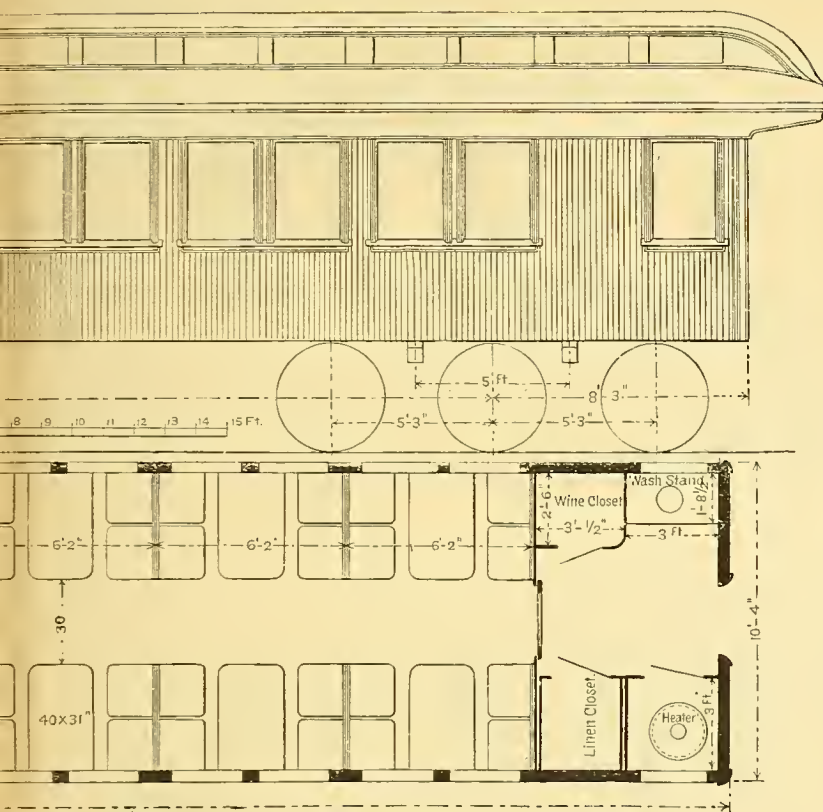


Fig. 194.

Elevation, showing style  
of window finish.

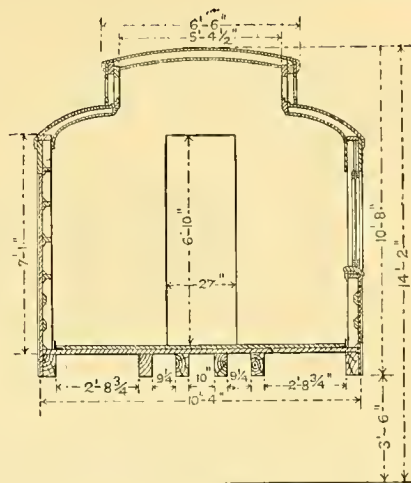
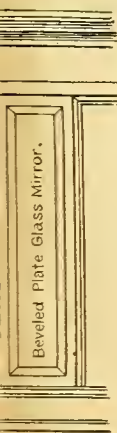


Fig. 192.

Section, giving general dimensions.

(Sections of the side of this car to a larger scale, showing Challender Truss and Wilson Flexible Window Blinds, are shown in Figs. 185a and 185b)

DINING CAR "KANSAS CITY," CHICAGO, EURLINGTON & QUINCY RAILROAD.  
With THEATRE SEATS, CHALLENGER TRUSS and WILSON FLEXIBLE WINDOW BLINDS.





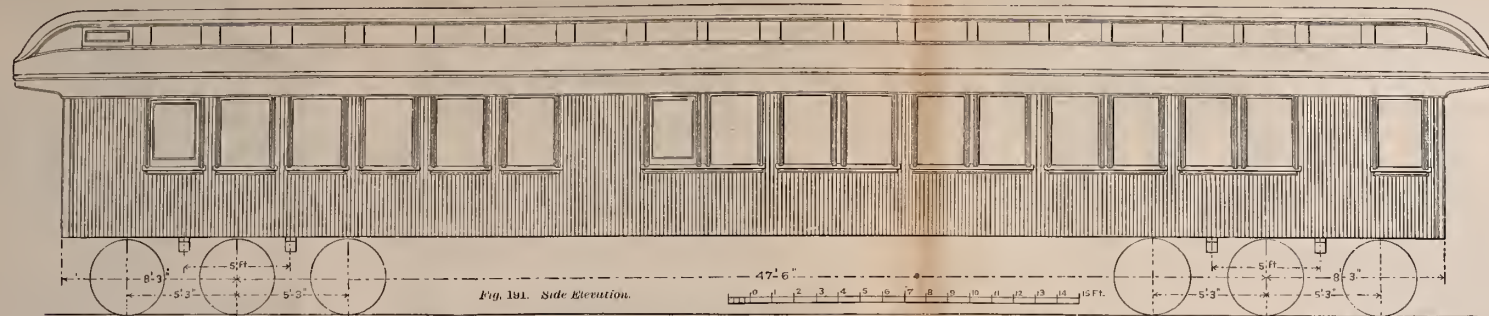


Fig. 191. Side Elevation.

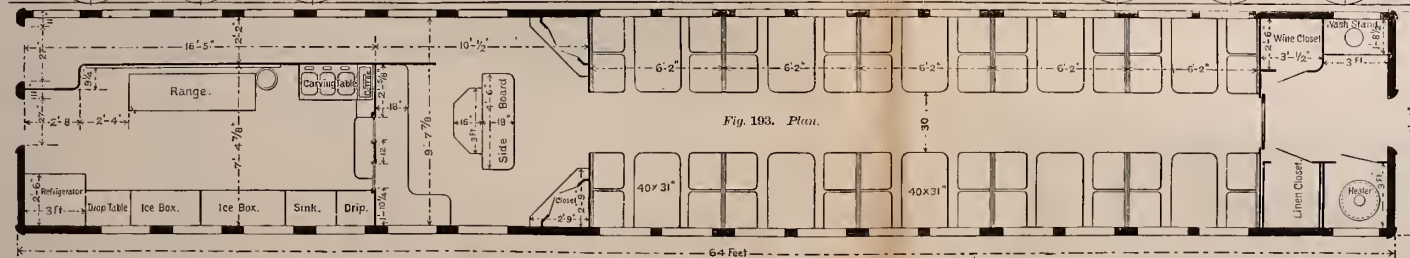


Fig. 193. Plan.

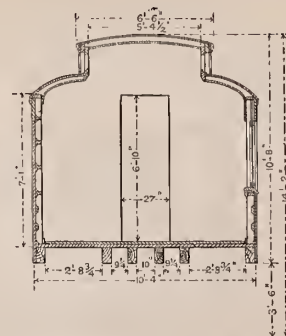


Fig. 192.

Section, giving general dimensions.

(Sections of the side of this car to a larger scale, showing Challender Truss and Wilson Flexible Window Blinds, are shown in Figs. 185a and 185b.)

(The ground plan of a dining car differing in detail from the above is shown in Fig. 214, Dining Car on Chicago, Milwaukee & St. Paul Railway.)

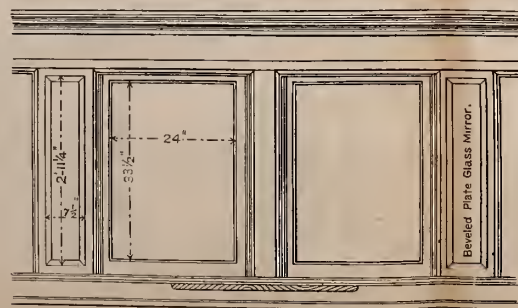


Fig. 194.

Elevation, showing style of window finish.

DINING CAR "KANSAS CITY," CHICAGO, EURLINGTON & QUINCY RAILROAD.  
With THEATRE SEATS, CHALLENDER TRUSS and WILSON FLEXIBLE WINDOW BLINDS.



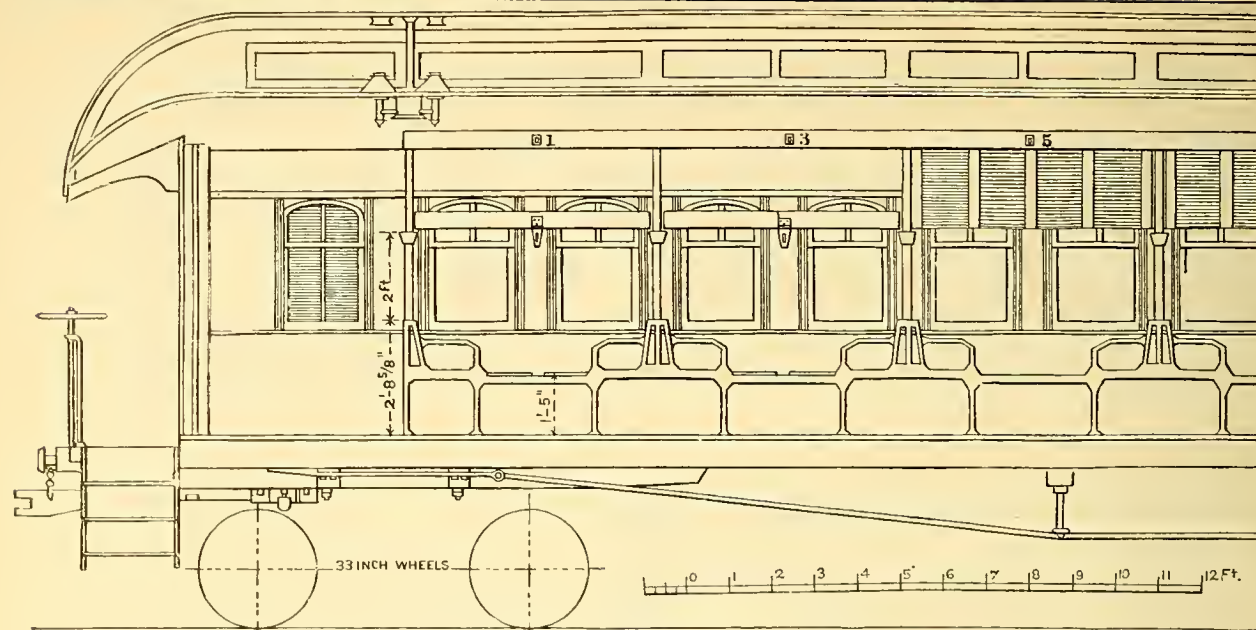
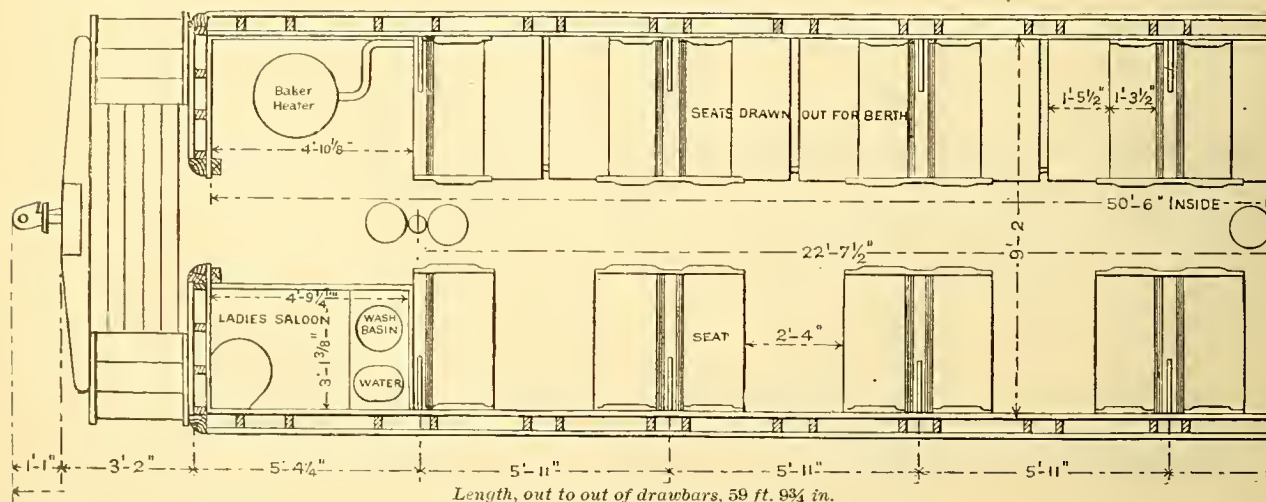


Fig. 195. Interior Elevation.



Length, out to out of drawbars, 59 ft. 9 3/4 in.

Fig. 196. Plan.

EMIGRANT SLEEPING CAR, UNION PACIFIC RAILROAD.

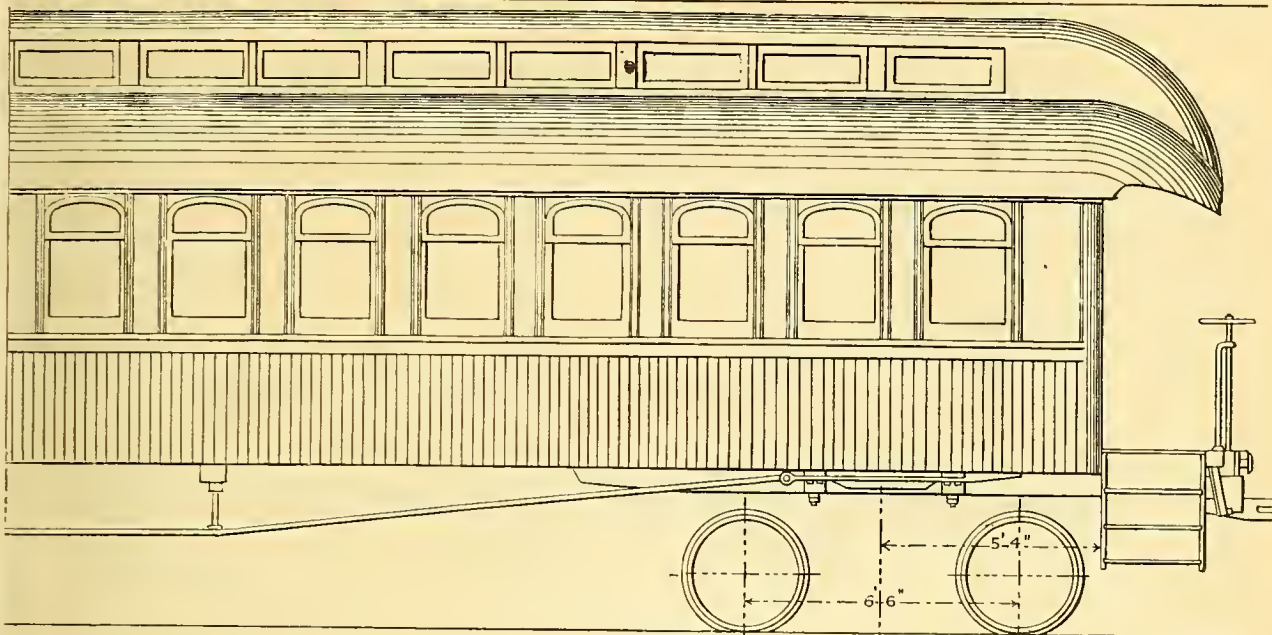
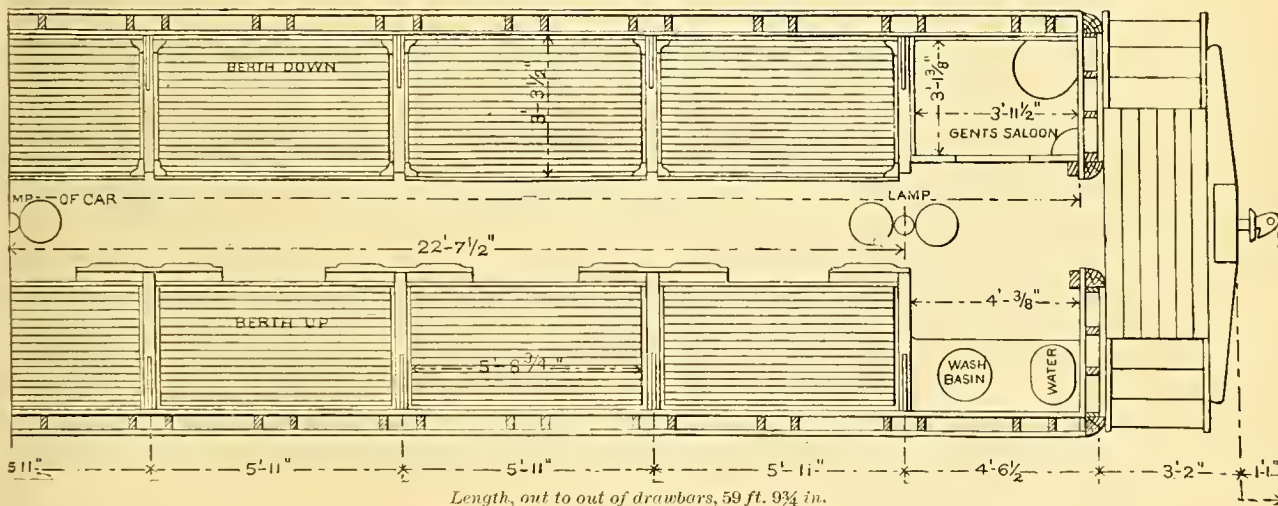


Fig. 197. Elevation.



Length, out to out of drawbars, 59 ft. 9 3/4 in.

Fig. 198. Plan.

EMIGRANT SLEEPING CAR, UNION PACIFIC RAILROAD.

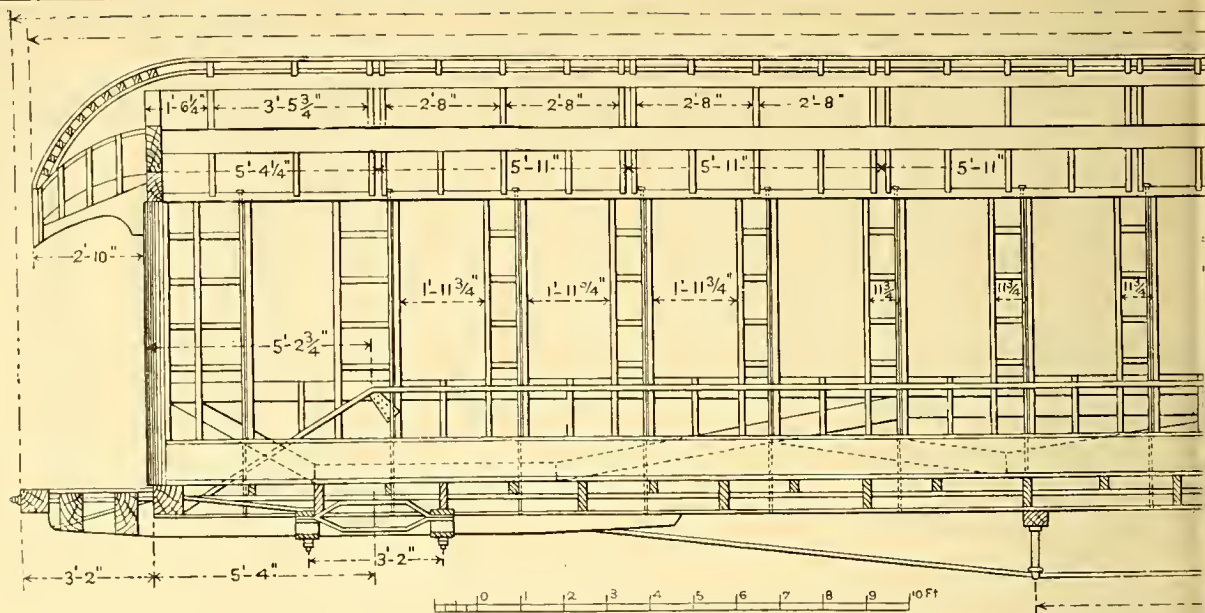
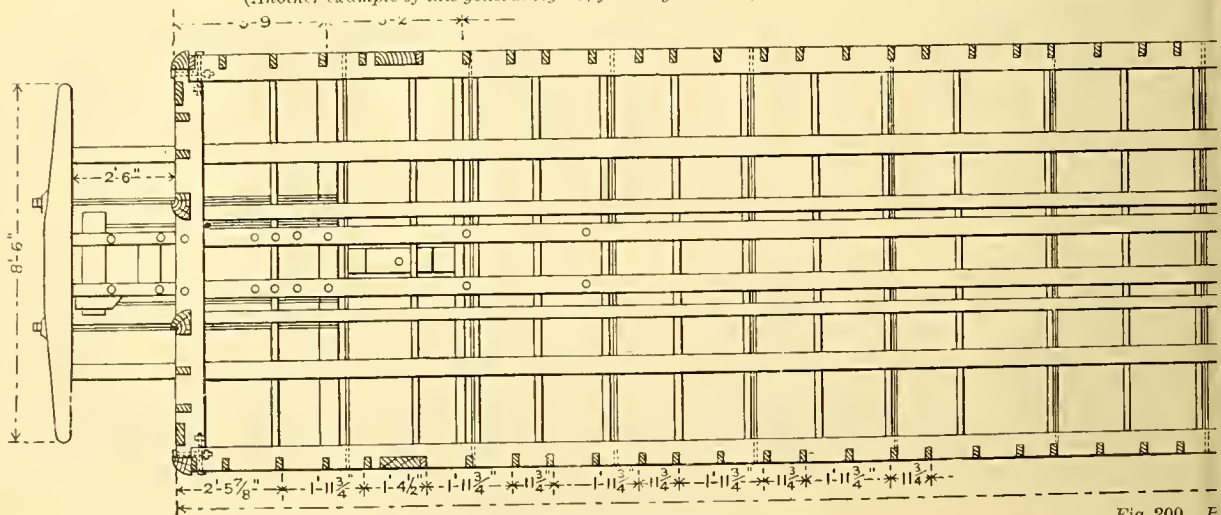


Fig. 199. Elevation, showing style of Framin

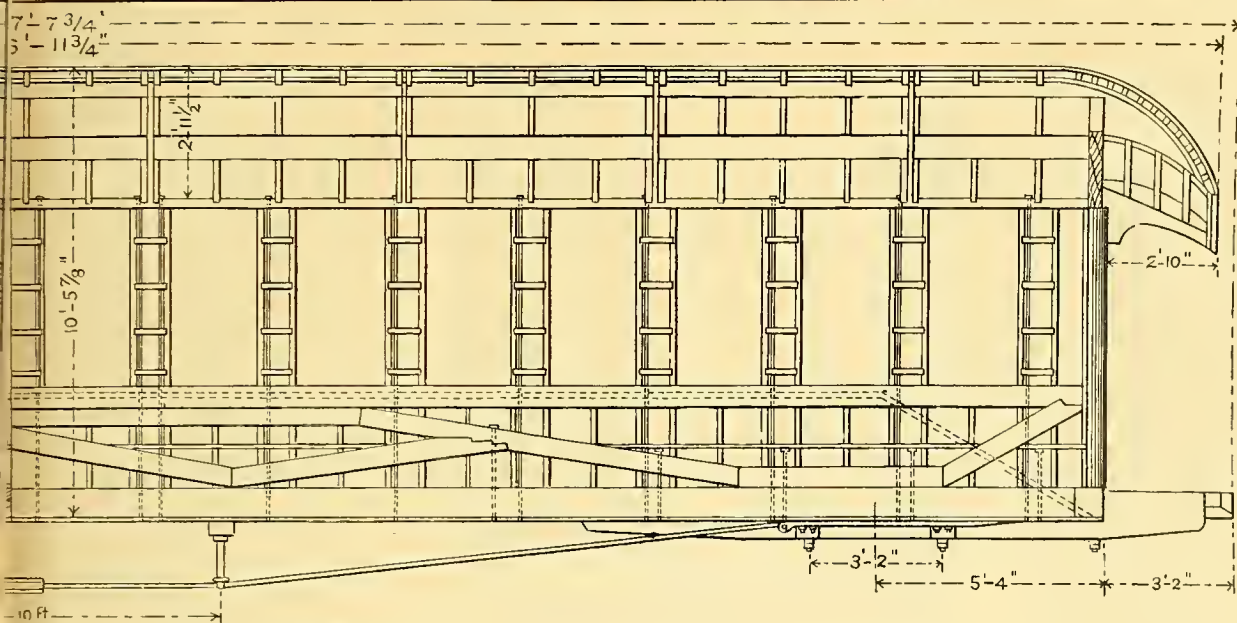
(Another example of this general style of framing is shown, with names of parts, in Fig. 159. Modifications of the



*Fig. 200. F*

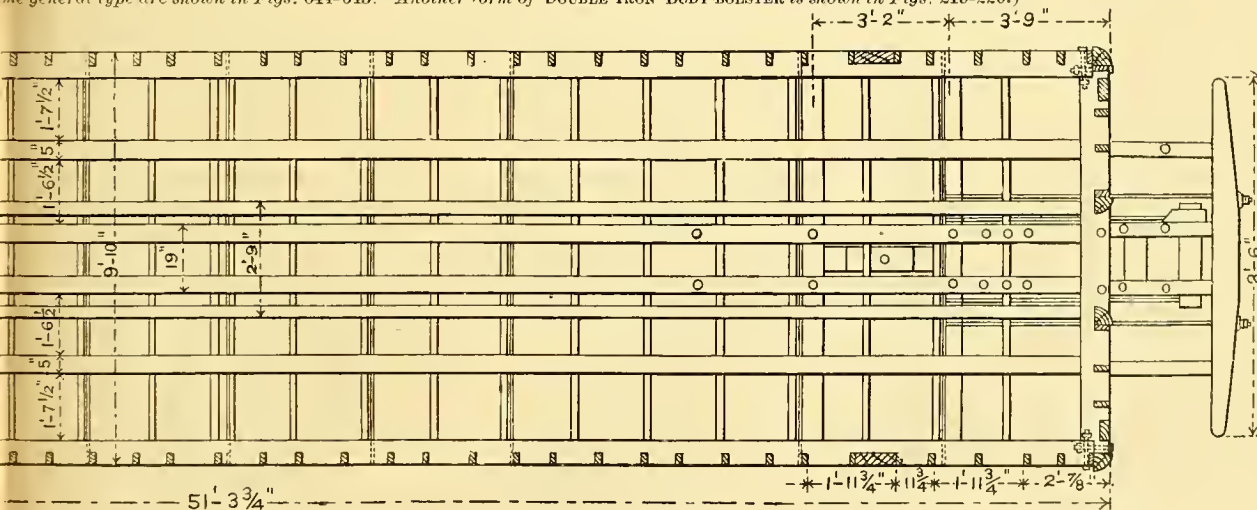
## EMIGRANT SLEEPING





DOUBLE IRON BODY-BOLSTER and INTERMEDIATE FLOOR.

Some general type are shown in Figs. 644-645. Another form of DOUBLE IRON BODY-BOLSTER is shown in Figs. 219-220.



of Floor Framing.

UNION PACIFIC RAILROAD.



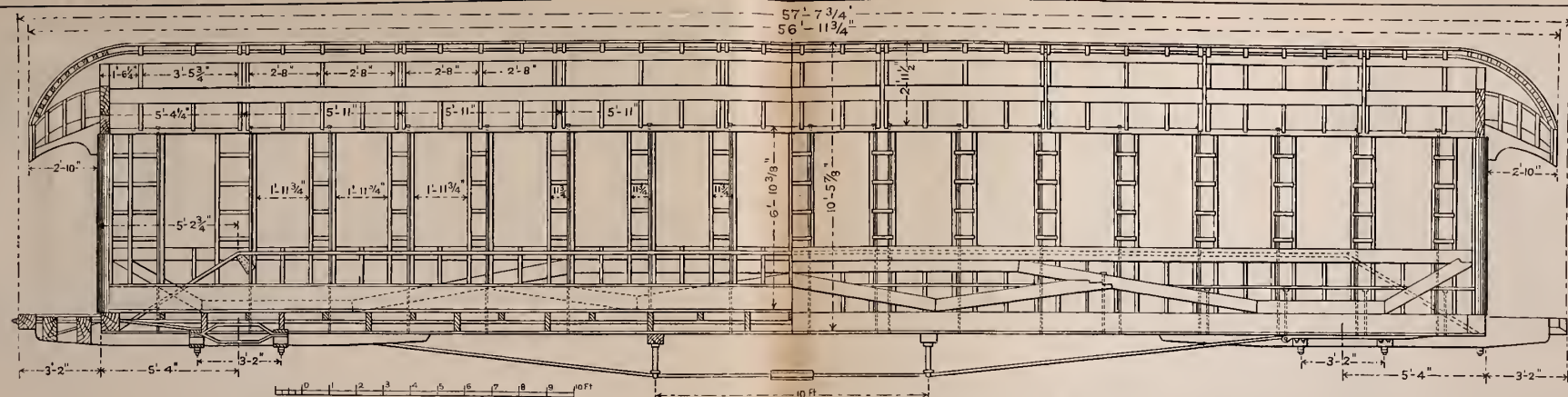


Fig. 199. Elevation, showing style of Framing, DOUBLE IRON BODY-BOLSTER and INTERMEDIATE FLOOR.

(Another example of this general style of framing is shown, with names of parts, in Fig. 136. Modifications of the same general type are shown in Figs. 644-645. Another form of DOUBLE IRON BODY-BOLSTER is shown in Figs. 219-220.)

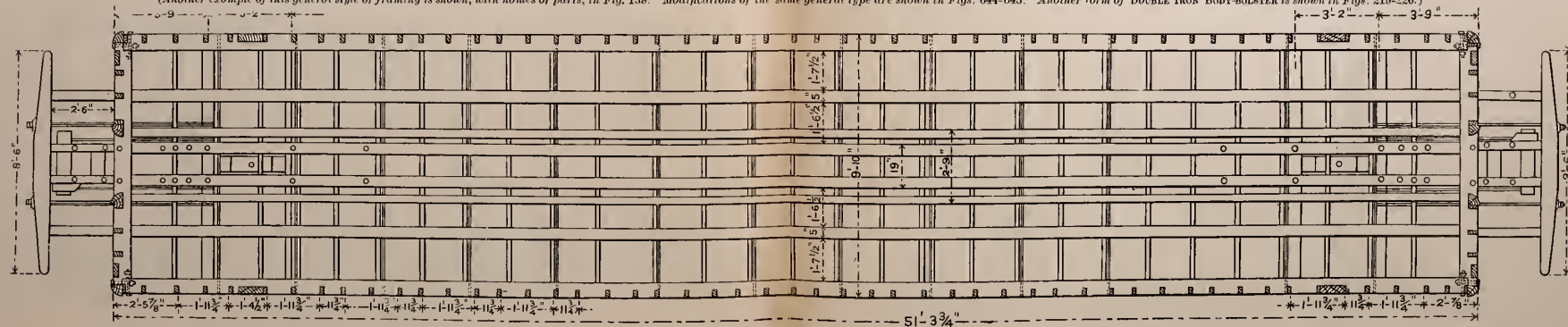


Fig. 200. Plan of Floor Framing.

EMIGRANT SLEEPING CAR, UNION PACIFIC RAILROAD.



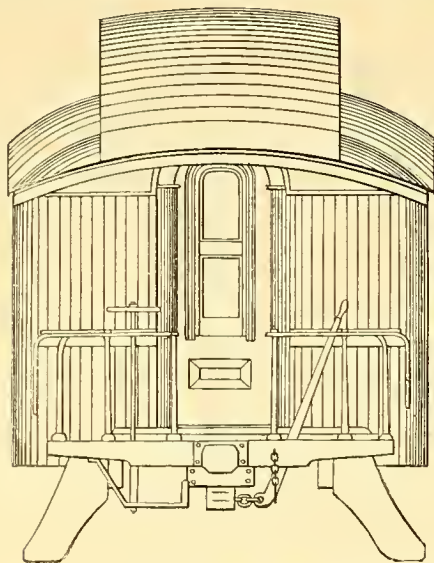


Fig. 201. End Elevation.

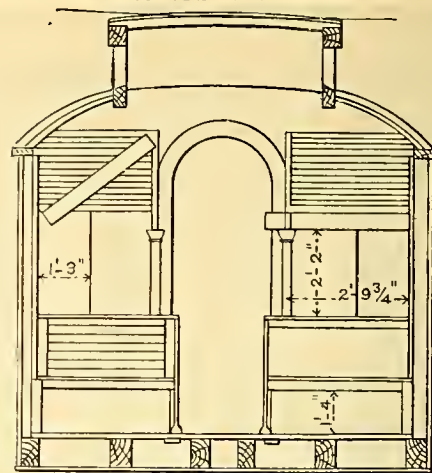


Fig. 202. Section showing berths up and down.

EMIGRANT SLEEPING CAR, UNION PACIFIC RAILROAD.

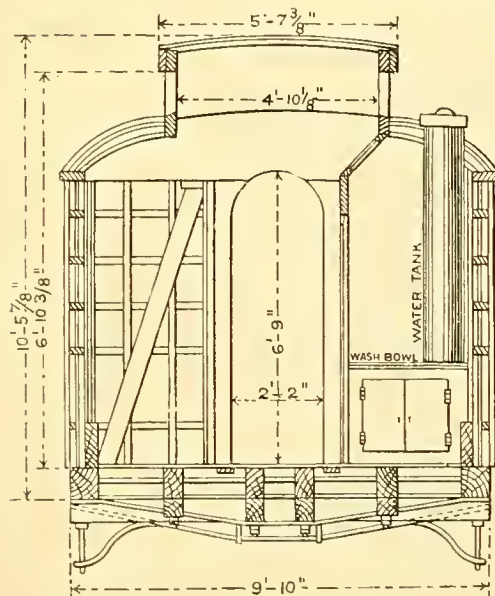


Fig. 203. Section showing end framing and DOUBLE-IRON BODY-BOLSIER.

NAMES OF PARTS OF ENGLISH FIRST-CLASS CARRIAGE;

Figs. 204-207.

- |   |   |
|---|---|
| 1. Solebar.                                       | 23. Bearing-spring Buckle, or Hoop.   |
| 2. Headstock, or Buffer Beam.                     | 31. Journal.  |
| 3. Cross-bearer, Crossbar, or Transome.           | 32. Collar, of Journal.   |
| 4. Diagonal.                                      | 33. Wheel-seat.   |
| 5. Middle Longitudinal.                           | 34. Grease Axle-box.  |
| 6. End Half-longitudinal.                         | 35. Grease Chamber.   |
| 7. Brake-shaft Cross-bearer, or Centre Crossbar.  | 36. Axle-box Cover, or Lid.   |
| 8. Buffing-spring Bed, or Back Chock.             | 37. Axle-box Keep.  |
| 9. Longitudinal Tie-rod.                          | 38. Axle-box Bearings, or Brass.  |
| 10. Transverse Tie-rod.                           | 39. Drawbar.  |
| 11. Strap Bolt.                                   | 40. Draw-hook.  |
| 12. Solebar Angle-iron.                           | 41. Coupling Shackle.   |
| 13. Headstock Cap (cast iron).                    | 43. Coupling Screw.   |
| 14. Axle-guard (plate pattern), or Hornplate.     | 44. Screw-Coupling, Nut and Gudgeons. [Lever.                                 |
| 15. Axle-guard Stay-rod, or Axle-guard Stretcher. | 45. Screw-coupling Weighted   |
| 16. Spider Plate (plain), or Underframe Plate.    | 41-45. Screw-coupling, consisting of Shackle, Screw, Nuts and Weighted Lever. |
| 21. Axle-guard Keep, Hornstay, or Bridle.         | 46. Safety Chain, or Side Chain, consisting of Eyebolt, Chain and Hook.       |
| 22. Bearing-spring.                               | 47. Buffer-head.  |

139. Door Pillar or Door  
Stile.
140. Door-light Bottom Sash-  
rail, or Glass-frame  
Bottom Sash-rail.
141. Door-light Stile, or  
Glass-frame Stile.
142. Quarter-light Mould-  
ing, or Glass-frame  
Stile.
143. Outer Double Floor, or  
Floor Underlining.
144. Bottom-side and End  
Knee.
145. Draw-hook Washer, or  
Drawbar Front-plate.
146. Draw-spring Cradle-  
plate.
150. Seat-board.
151. Cushion Back-rail.
152. Back Seat Rail.
160. Lamp Case.
161. Lamp-cover, or Lamp  
Protector.
162. Lamp-plug.
163. Lamp-plug Stand.
164. Lamp-cover Spring-  
catch.
165. Lamp-burner.
166. Lamp-glass.
167. Lamp-case Base, or  
Packing.
168. Inner Lamp-ring.
170. Communication eord  
Pulley.
171. Lower Foot-board.
172. Upper Foot-board (con-  
tinuous).
173. Step-iron, or Leg-iron.
174. End Ascending-step.
175. End Ascending-rail.
176. Roof Ascending-rail, or  
Roof Commode-handle.
177. Commode-handle.
178. Upper Door-hinge.
179. Centre Door-hinge and  
Stop (Cross' Patent).
180. Lower Door-hinge.
181. Door-handle.
182. Private Lock. [Braeket.
183. Destination-board
184. Side Lamp-iron.
185. End Lamp-iron.
186. India-rubber Body-  
cushion, or Attock's  
Body-block.
187. Body Holding-down  
Bolt.







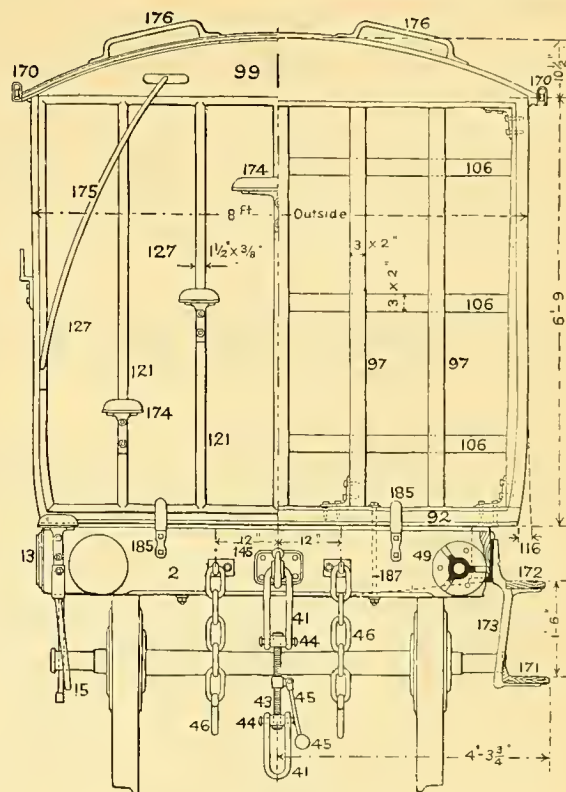
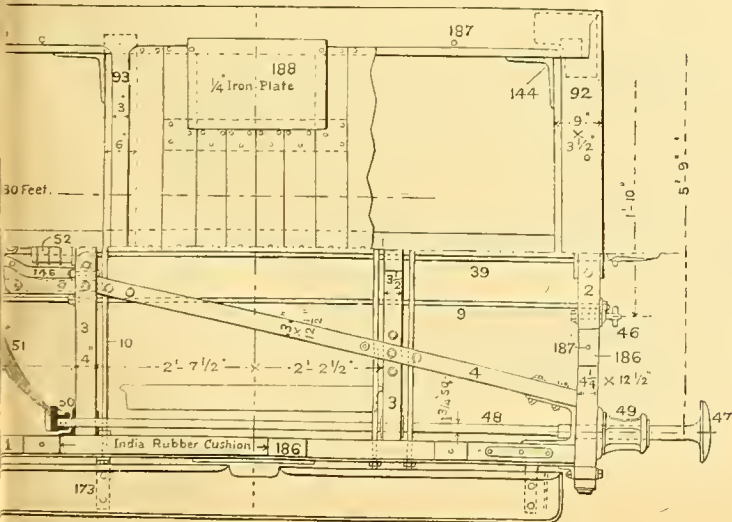


Fig. 207. End Elevation.  
ENGLISH FIRST-CLASS CARRIAGE, CALEDONIAN RAILWAY.

LIST OF NAMES OF PARTS:

*Figs. 204-7.*

(Continued from previous page.)

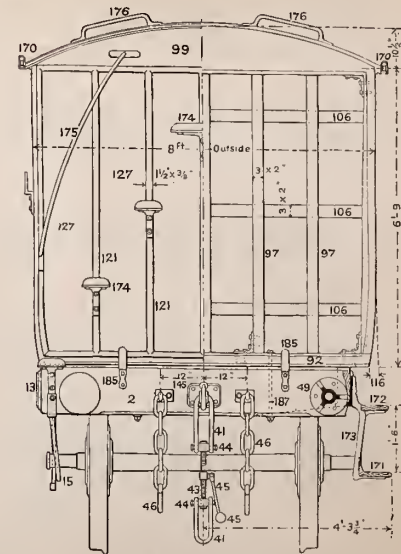
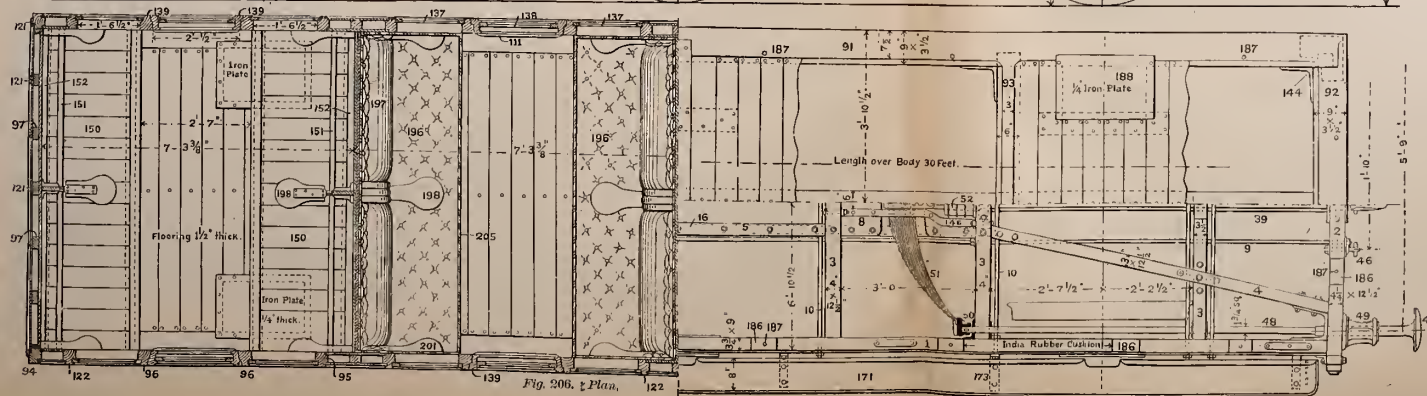
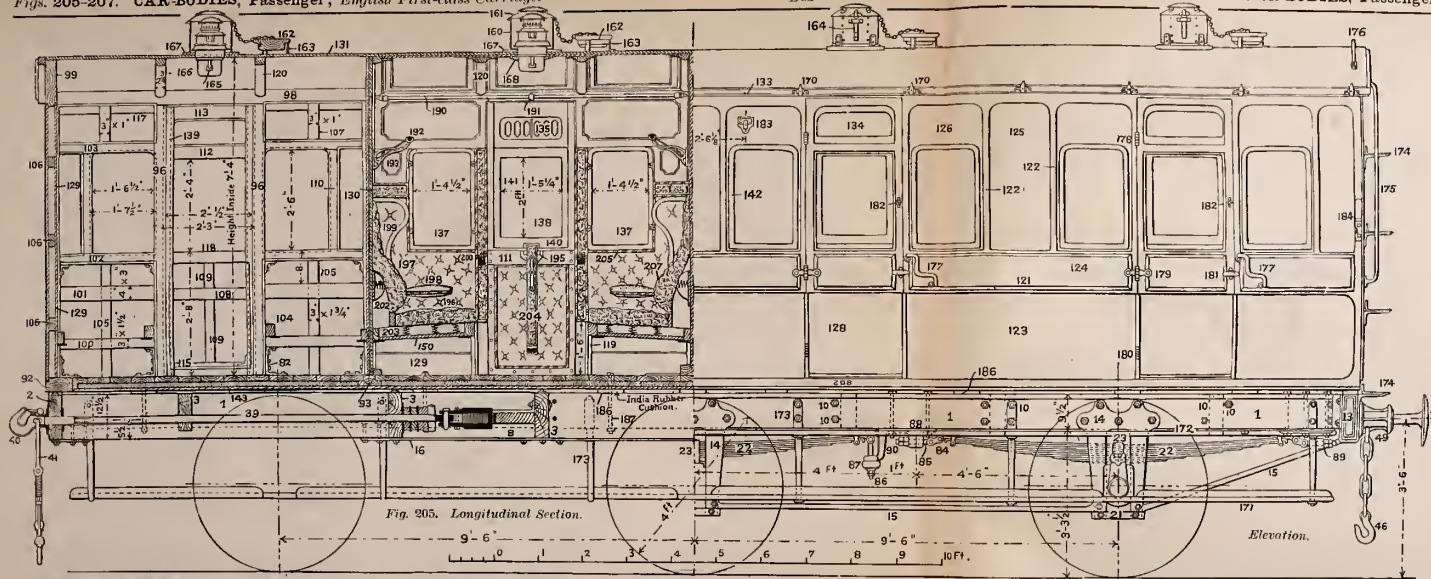
188. *Splasher, Wheel-cover, or Wheel-plate.*
190. *Curtain-rod.*
191. *Curtain-rod Bracket.*
192. *Parcel-net Rod.*
193. *Parcel-net Bracket.*
194. *Parcel-net.*
195. *Glass-strion Roller.*
196. *Seat Cushion (reversible).*
197. *Back Squab.*
198. *Folding Arm-rest, or Elbow-rest.*
199. *Head-rest.*
200. *Arm Sling, Arm Holder, or Arm Strap.*
201. *Side Arm-rest, or Elbow-rest.*
202. *Back Squab Sofa-spring.*

203. *Seat Sofa-spring.*  
204. *Glass-string, or Glass-strap.*  
205. *Seaming Lace.*  
206. *Broad Lace.*  
207. *Curled Horsehair.*  
208. *Door Sill-plate.*

### GENERAL CLASSIFICATION.

- Nos. 1-21 and 88-90. *Underframe.*  
 Nos. 22-38 and 84-87. *Running Gear.*  
 Nos. 39-52 and 145, 146. *Draw and Buffing Gear.*  
 Nos. 91-144 and 150-152. *Body.*  
 Nos. 194-207. *Trimming.*  
 Nos. 177-182, 190-195 and 208. *Furniture.*





ENGLISH FIRST-CLASS CARRIAGE, CALEDONIAN RAILWAY.

LIST OF NAMES OF PARTS;  
Figs. 204-7.

(Continued from previous page.)

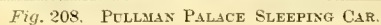
- 188. Splasher, Wheel-cover, or Wheel-plate.
- 190. Curtain-rod.
- 191. Curtain-rod Bracket.
- 192. Parcel-net Rod.
- 193. Parcel-net Bracket.
- 194. Parcel-net.
- 195. Glass-string Roller.
- 196. Seat Cushion (reversible).
- 197. Back Squab.
- 198. Folding Arm-rest, or Elbow-rest.
- 199. Head-rest.
- 200. Arm Sling, Arm Holder, or Arm Strap.
- 201. Side Arm-rest, or Elbow-rest.
- 202. Back Squab Sofa-spring.

- 203. Seat Sofa-spring.
- 204. Glass-string, or Glass-strap.
- 205. Seaming Lace.
- 206. Broad Lace.
- 207. Curled Hiltchair.
- 208. Door Sill-plate.

GENERAL CLASSIFICATION.

- Nos. 1-21 and 88-90. Underframe.
- Nos. 22-38 and 84-87. Running Gear.
- Nos. 39-52 and 145, 146. Draw and Buffing Gear.
- Nos. 91-144 and 150-152. Body.
- Nos. 194-207. Trimming.
- Nos. 177-182, 190, 195 and 208. Furniture.





SS. 6

3' 6" 5' 0" 30' 0" 6' 0" 4' 5" 2' 5"

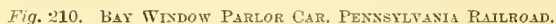
GENTLEMEN'S SALOON

LADIES' SALOON

6' 0" 4' 5" 2' 5"

SS. 6

(Old style; a smoking room is now almost invariably provided, as in the plan below. In many cases the smoking compartment is the first entered at one end and runs entirely across the car, the lavatory, closets and heater being interposed between the smoking room and the main compartment.)



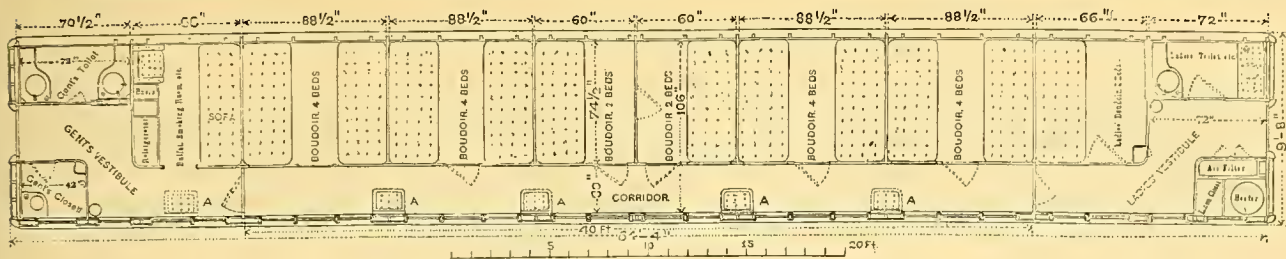
This detailed floor plan illustrates the interior layout of the USS Intrepid. The plan includes several key areas:

- Office:** Located at the front left, featuring a sofa bed, writing desk, mirror, safe with bookcase over ice water, and another mirror.
- Saloon:** Situated behind the office, containing a table berth over curtain, folding bed closed, cabinet or buffet, drapery, and a basin.
- Chamber:** Divided into upper and lower sections, each with its own closet and mirror.
- Corridor:** A central passage measuring 18'0" wide, connecting the main rooms.
- Other Features:** Includes a heater, coals storage, and various closets throughout the plan.

The overall dimensions of the interior are 6'6" by 7'11".

(For details of interior finish, see Fig. 673.)

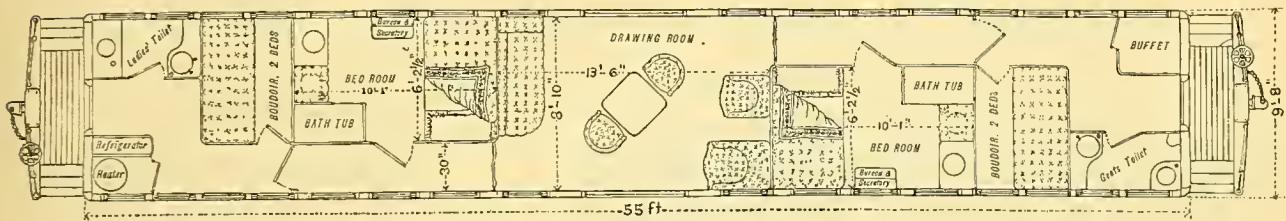
(Officers' cars are also very commonly provided with a kitchen, which is usually placed at the extreme end of the car.)



*Fig. 212.*

MANN "BOUDOIR" SLEEPING CAR.

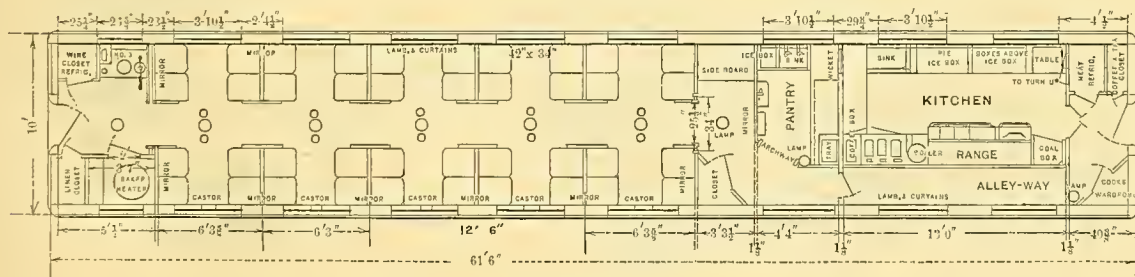
(For details of arrangements of boudoirs and berths see Figs. 680-681.)



*Fig. 213.*

MANHATTAN PRIVATE CAR, "ADELINA PATTI."

(An external view of this car, giving also the general appearance of Fig. 212 above, is shown in Fig. 50.)



*Fig. 214.*

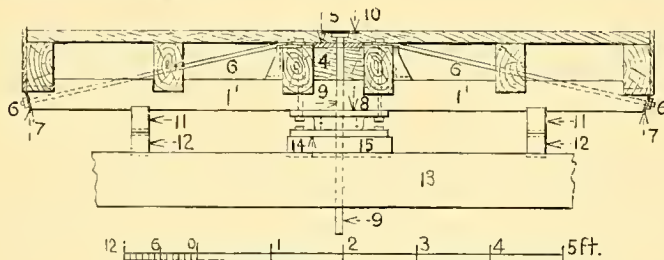
DINING CAR, CHICAGO, MILWAUKEE & ST. PAUL RAILROAD, *with* 10 SECTIONS OR TABLES.

(Another style of Dining Car is shown with more detail in Figs. 191-194. The part marked ALLEY-WAY hereon is more properly a CORRIDOR.)

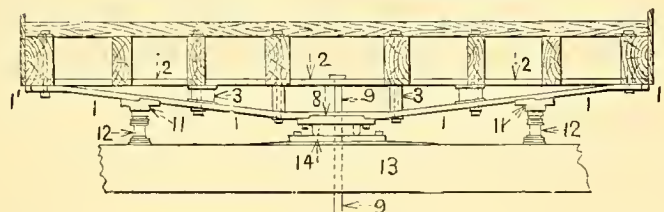
## BOLSTERS, ETC.

NAMES OF PARTS OF BOLSTERS, ETC.; *Figs. 215 to 225.*

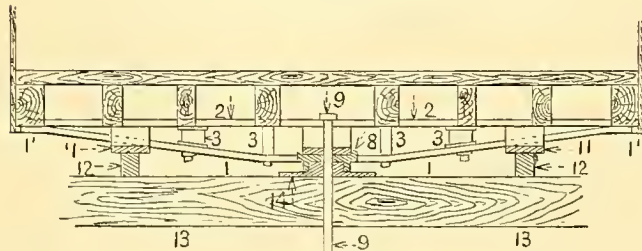
- |                                  |                                    |  |                         |
|----------------------------------|------------------------------------|--|-------------------------|
| 1'. Body-bolster.                | 4. Body-bolster Truss-block.       | 7. Body-bolster Truss-rod Washer.        | 11. Body Side-bearing.  |
| 1. Body-bolster Compression-bar. | 5. Body-bolster Truss-rod Bearing. | 8. Body Centre-plate.                    | 12. Truck Side-bearing. |
| 2. Body-bolster Tension-bar.     | 6. Body-bolster Truss-rod.         | 9. King-bolt or Centre-pin.              | 13. Truck-bolster.      |
| 3. Body-bolster Thimble.         |                                    | 10. King-bolt Plate or Centre-pin Plate. | 14. Truck Centre-plate. |
|                                  |                                    |  | 15. Centre-plate Block. |



*Fig. 215.*  
WOODEN BODY-BOLSTER.  
Transverse Section of Floor timbers, showing Bolsters.

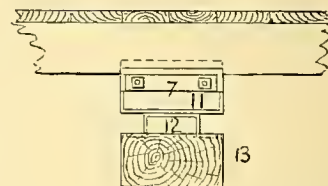


*Fig. 217.*  
IRON BODY-BOLSTER.  
Transverse Section of Floor-timbers, showing Bolsters.

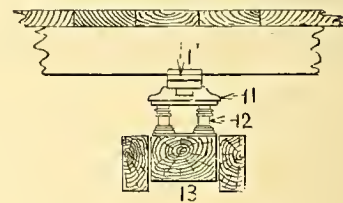


*Fig. 219.*  
DOUBLE IRON BODY-BOLSTER.  
Transverse Section of Floor, showing Bolsters.

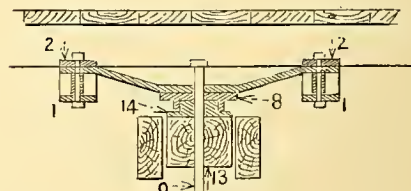
(Other forms of this bolster, differing somewhat in detail, are shown in Figs. 195-203 and in Figs. 1971-73.)



*Fig. 216.*  
WOODEN BODY-BOLSTER.  
Side View.



*Fig. 218.*  
IRON BODY-BOLSTER.  
Side View.



*Fig. 220.*  
DOUBLE IRON BODY-BOLSTER.  
Cross Section.



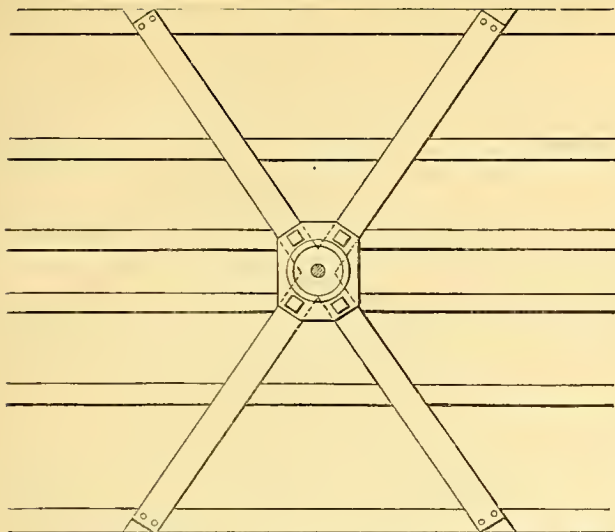


Fig. 221. Inverted Plan.  
SNOW BODY-BOLSTER.



Fig. 222.  
SNOW BODY-BOLSTER,  
Side View.



Fig. 223.  
SNOW BODY-BOLSTER,  
End View.

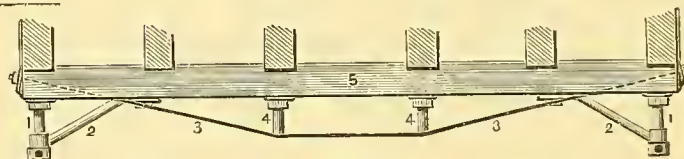


Fig. 224.  
CROSS-FRAME TRUSS OR NEEDLE-BEAM TRUSS.

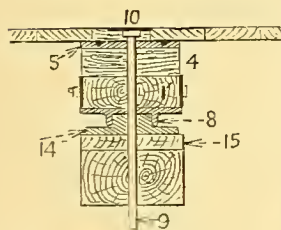


Fig. 225.  
COMPOUND BODY-BOLSTER,  
Cross Section.

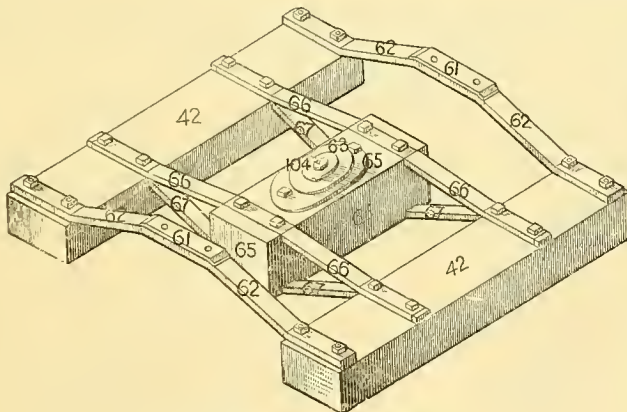


Fig. 226. Perspective View.  
TRUCK BOLSTER FOR SIX-WHEELED TRUCK.  
(See also TRUCKS and TRUCK DETAILS.)

#### NAMES OF PARTS; Fig. 224.

1. Body Queen-post.
2. Body Queen-post Stay.
3. Cross-frame Truss-rod, or Needle-beam Truss-rod.
4. Cross-frame Queen-post, or Needle-beam Queen-post.
5. Cross-frame Tie-timber, or Needle-beam.

#### NAMES OF PARTS; Fig. 226.

42. Spring-beam.
61. Truck Side-bearing.
62. Side-bearing Bridge.
63. Truck Centre-plate.
65. Centre-bearing Beam.
66. Centre-bearing Arch-bar.
67. Centre-bearing Inverted Arch-bar.
104. King-bolt, or Centre-pin.

Fig. 227. COMPRESSION-ROD BRAKE.  
Side View.

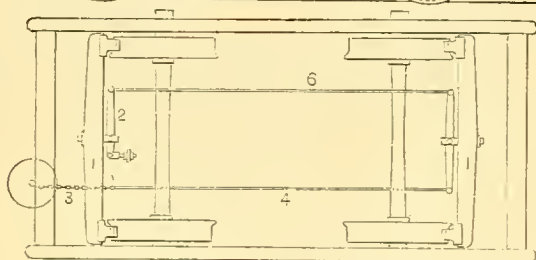
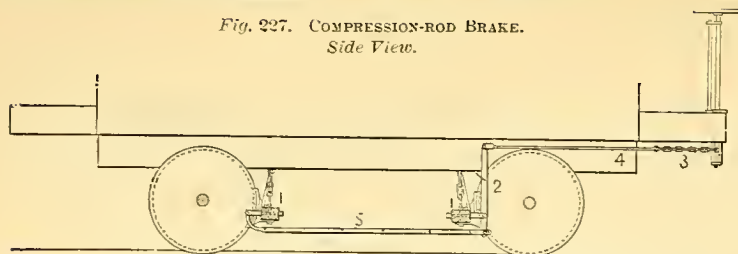


Fig. 228. BRAKE FOR DROP-BOTTOM CAR. Plan.

LIST OF NAMES OF PARTS OF BRAKES:  
Figs. 227-235.

1. Brake-beam.
2. Brake-lever. (Often further distinguished as *Dead-lever* and *Live-lever*. See Figs. 238-339.)
3. Brake-shaft Chain.
4. Brake-shaft Connecting-rod.
5. Lower Brake-rod.
6. Secondary Brake-rod.
7. Floating-lever.
8. Floating Connection-rod.
9. Centre Brake-lever.
10. Centre Brake-lever Chain.
11. Centre Brake-lever Sheaves.
12. Long Brake-rod.

(Another style of Brake-gear, differing in detail from all of the following, is shown in Figs. 338-339.)

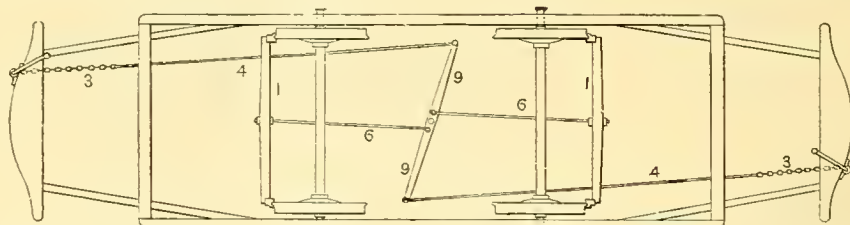


Fig. 229. TYLER BRAKE FOR STREET CARS. Plan.

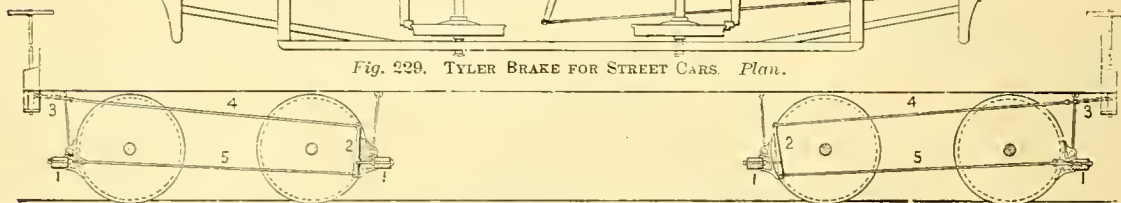


Fig. 230. SINGLE-LEVER BRAKE. Side View.

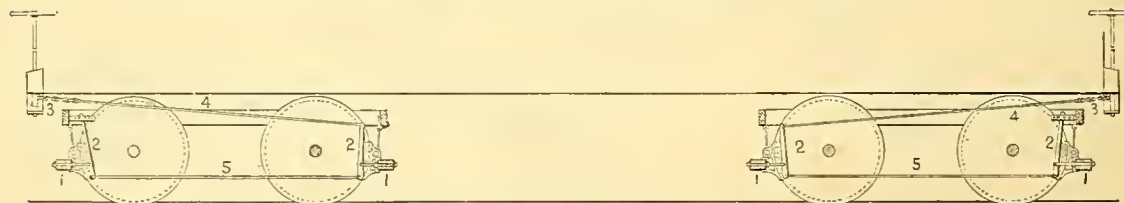
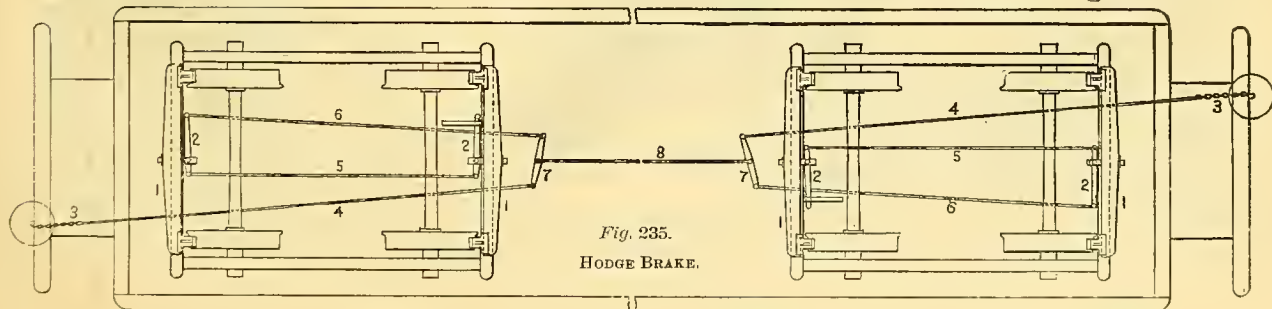
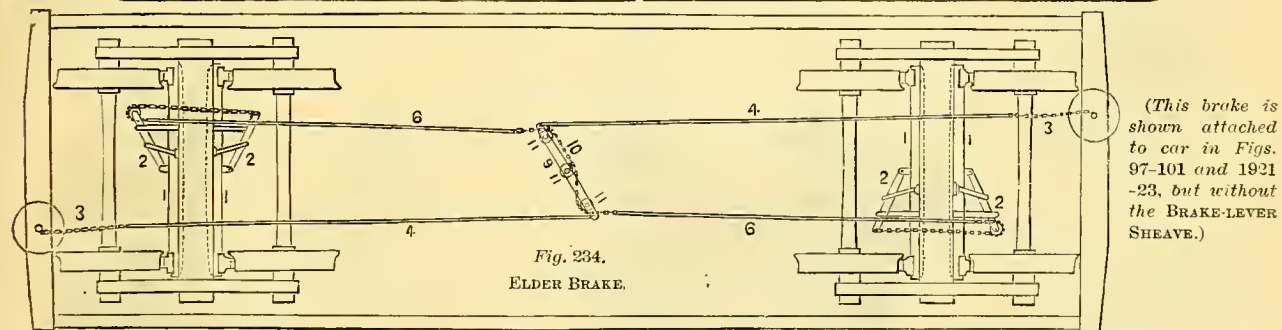
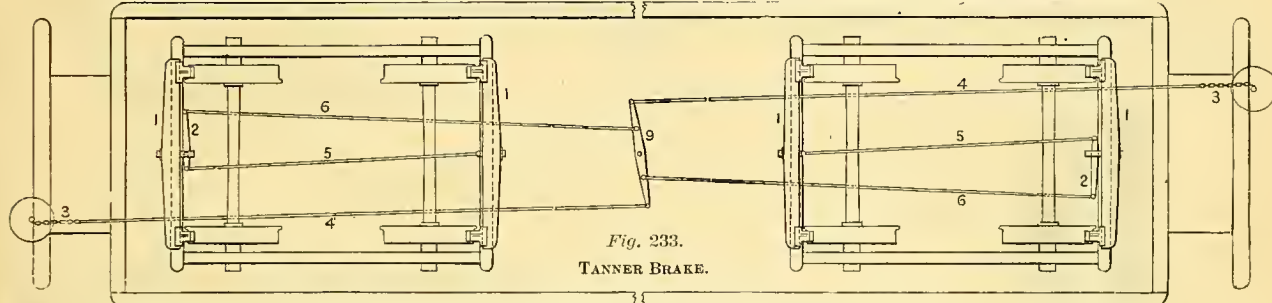
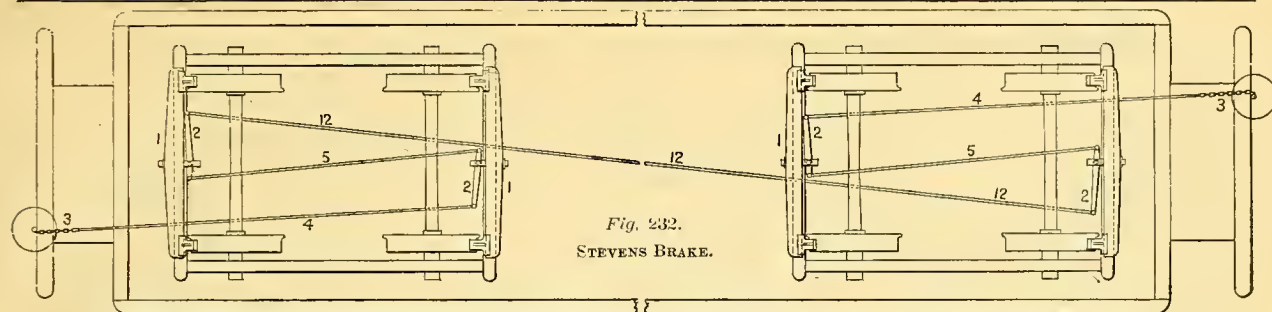


Fig. 231. DOUBLE-LEVER BRAKE. Side View.





NAMES OF PARTS OF BRAKES, FIGS. 236-246 (See also Figs. 249-251.)

- |                                |                                    |
|--------------------------------|------------------------------------|
| 1. Brake-block.                | 10. Brake Safety-chain Eye-bolt.   |
| 2. Brake-shoe.                 | 11. Brake-lever (see Note).        |
| 3. Brake-shoe Key.             | 12. Brake-lever Fulcrum.           |
| 4. Trussed Brake-beam.         | 13. Brake-lever Stop.              |
| 5. Brake-beam Truss-rod.       | 14. Brake-hanger Bearing.          |
| 6. Brake-beam King-post.       | 15. Parallel Brake-hanger.         |
| 7. Brake-hanger.               | 16. Parallel Brake-hanger Carrier. |
| 8. Brake-hanger Carrier.       | 17. Parallel Brake-hanger Eye.     |
| 9. Brake Safety-chain or Link. |                                    |

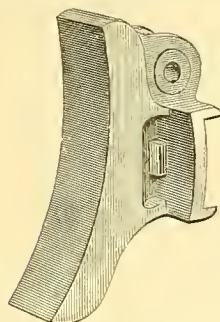


Fig. 237. BRAKE-HEAD (one of many forms).

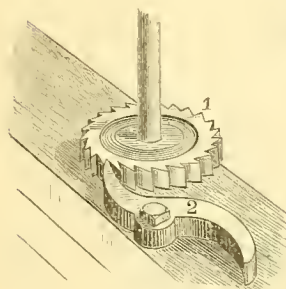


Fig. 241. (1) BRAKE RATCHET-WHEEL. (2) BRAKE-PAWL.  
(Another style, for freight service, is shown in Figs 252-262.)

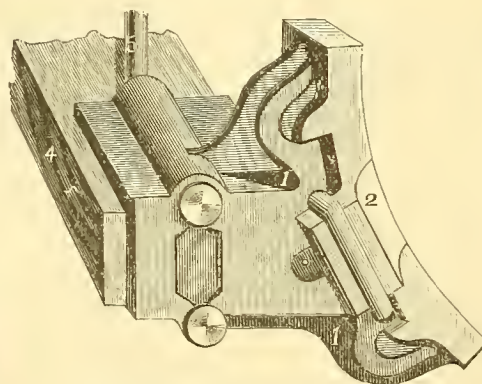


Fig. 238. BRAKE-BLOCK SHOE AND KEY.



Fig. 239. CONGDON BRAKE-SHOE AND CHRISTIE BRAKE-SHOE AND HEAD.



Fig. 240.

Figs. 242-243-244, STANDARD BRAKE SHOE AND HEAD (shown among TRUCK DETAILS, BRAKE-SHOES, Figs. 1977-1979; as also the BANNING BRAKE-SHOE, Figs. 1980-1981.)

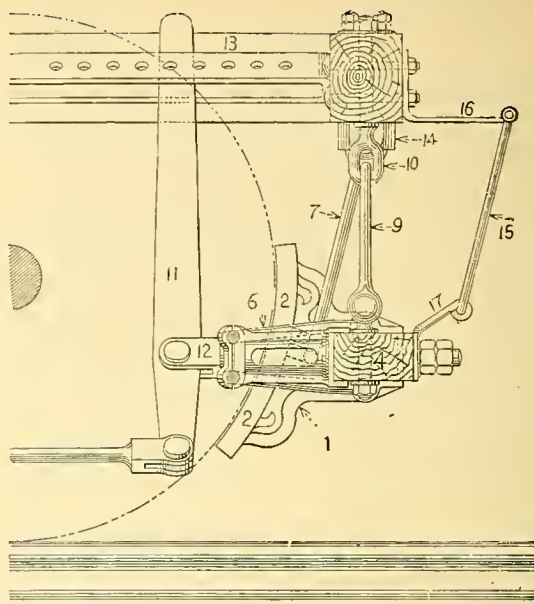


Fig. 236. Side View.  
TRUSSED BRAKE-BEAM.

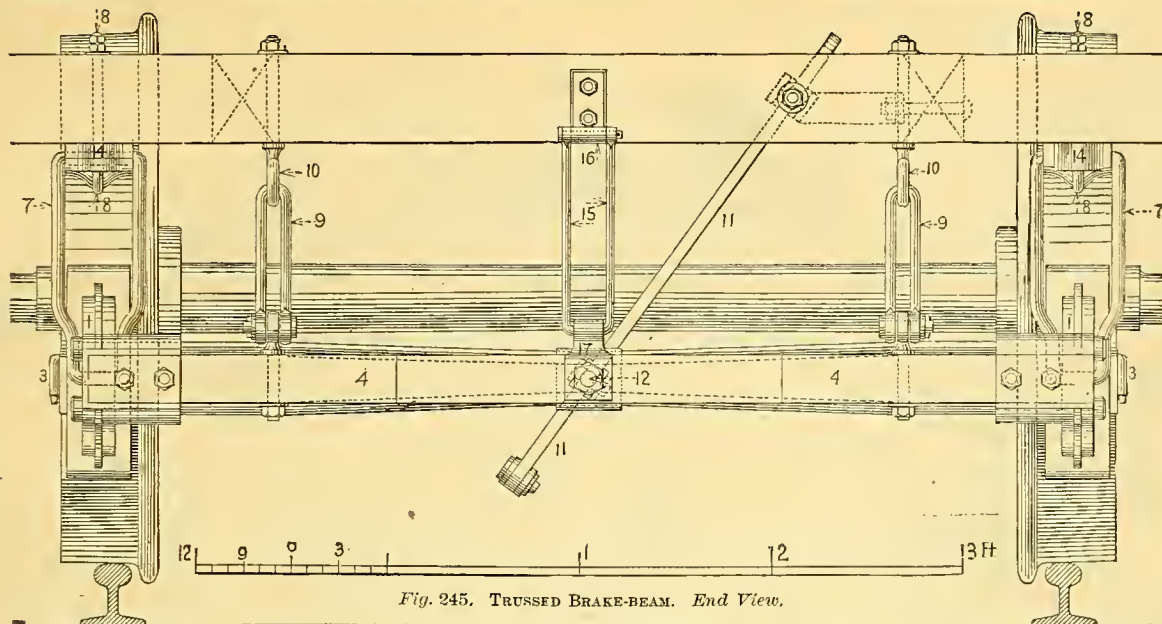


Fig. 245. TRUSSED BRAKE-BEAM. End View.

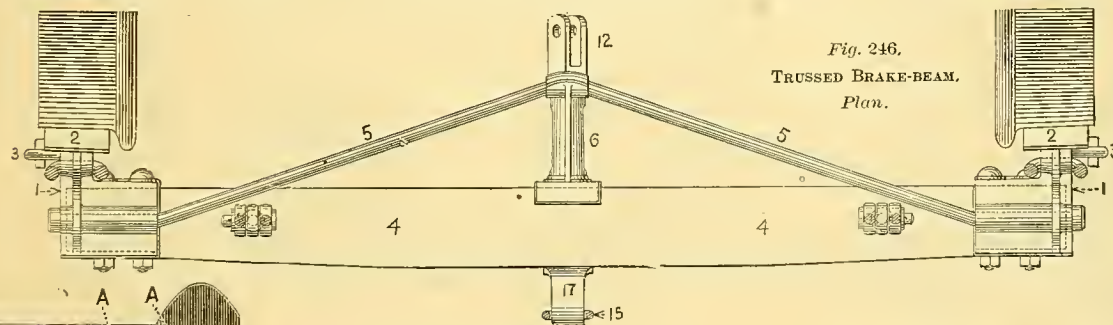
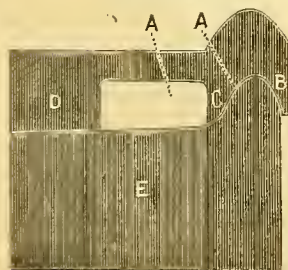
Fig. 246.  
TRUSSED BRAKE-BEAM.  
Plan.

Fig. 247. Section.

## NAMES OF PARTS, Figs. 247-8.

- A. Flange Bearing-block.
- B. Outside Flange-lip.
- C. Inside Flange-lip.
- D. Tread Bearing-block.
- E. Tire.

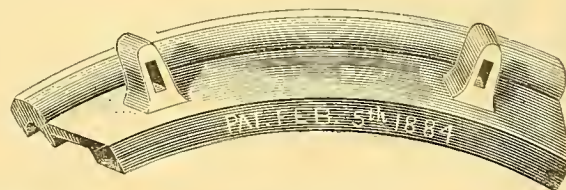


Fig. 248. Side View.

ROSS FLANGE BRAKE-SHOE.

NAMES OF PARTS: Figs. 249-251.

1. Brake-block.
2. Brake-shoe.
4. Trussed Brake-beam.
5. Brake-beam Truss-rod.
6. Brake-beam King-post.
7. Brake-hanger.
8. Brake-hanger Carrier.
11. Brake-lever (see note to Fig. 236).
12. Brake-lever Fulcrum.
13. Brake-lever Stop.
14. Brake-hanger Bearing.
18. Brake-lever Guide.
19. Brake-lever Coupling-bar.
20. Coupling-bar Pin.
21. Brake-shaft Connecting Rod.

PROPOSED STANDARD DRAW-  
GEAR FOR FREIGHT  
SERVICE.

Designed by Geo. Westing-  
house, Jr.

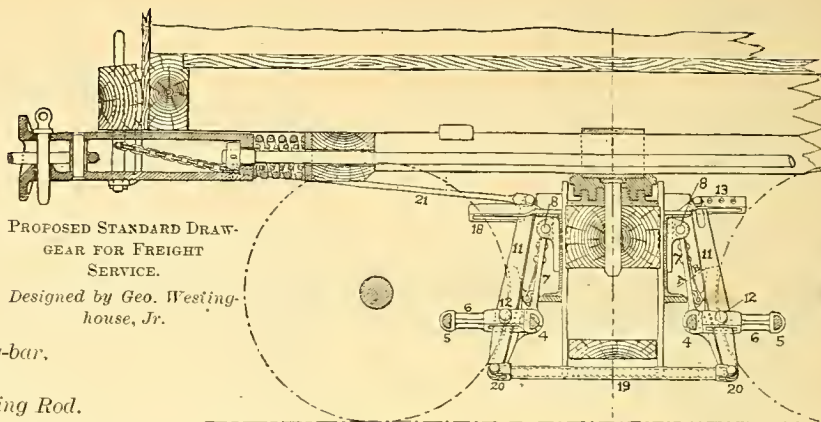


Fig. 249. Longitudinal Section through Centre of Car.

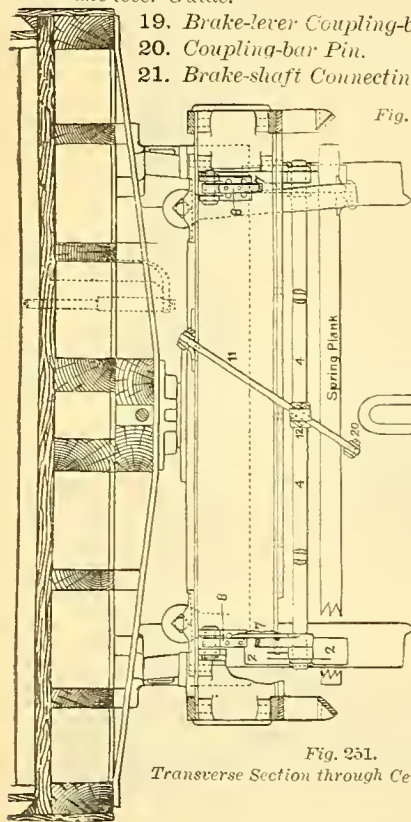


Fig. 251.  
Transverse Section through Centre of Truck.

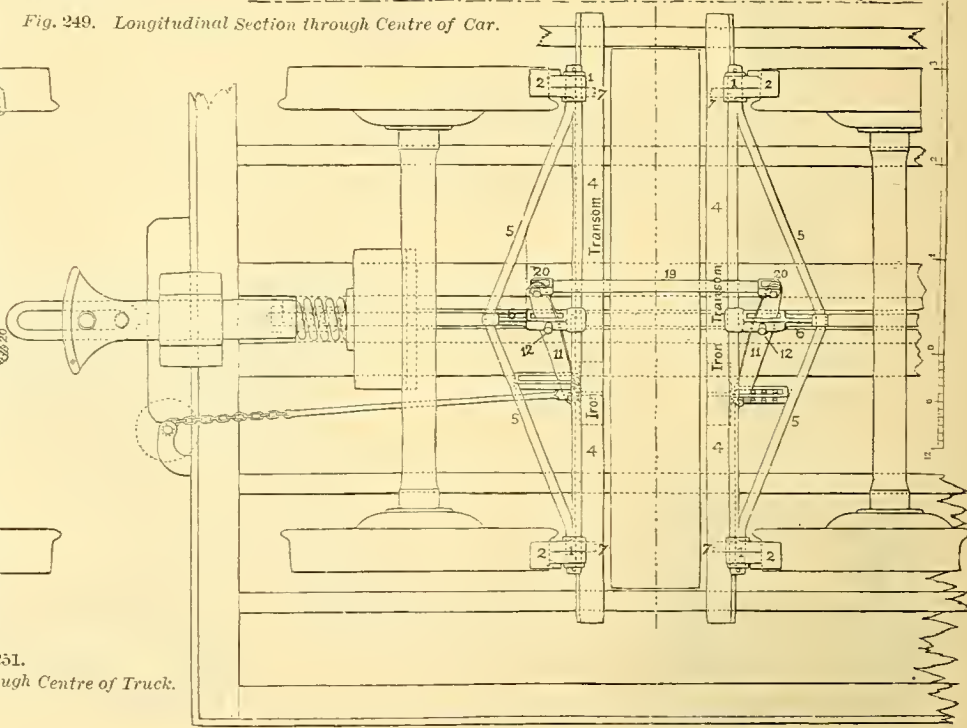


Fig. 250. Inverted Plan.



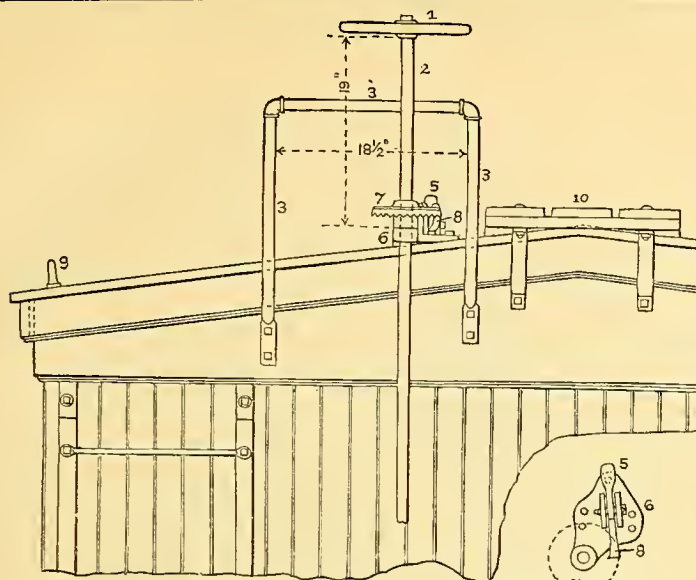


Fig. 252. End Elevation.

Fig. 253. Plan.

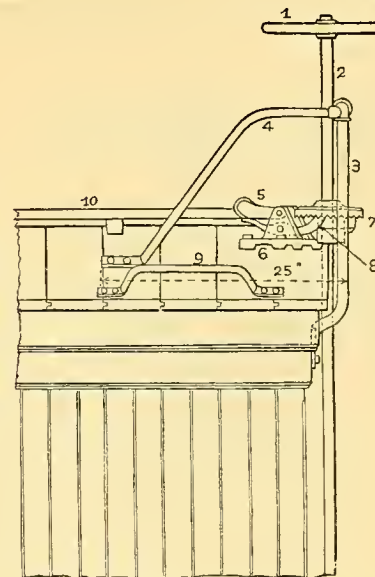


Fig. 254. Side Elevation.

BRAKE-GEAR OF NEW YORK CENTRAL AND HUDSON RIVER RAILROAD and connecting lines, and NEW YORK, WEST SHORE & BUFFALO RAILWAY.  
(Shown attached to cars in Figs. 93-96 and 97-101 ; shown enlarged on the following page.)

#### NAMES OF PARTS : Figs. 252-254.

- |                     |                                     |
|---------------------|-------------------------------------|
| 1. Brake-wheel.     | 6. Brake-pawl Carrier.              |
| 2. Brake-shaft.     | 7. Brake Ratchet.                   |
| 3. Roof Hand-rail.  | 8. Brake Pawl.                      |
| 4. Hand-rail Brace. | 9. Roof Grab-iron or Ladder-handle. |
| 5. Brake-pawl Dog.  | 10. Running-board.                  |

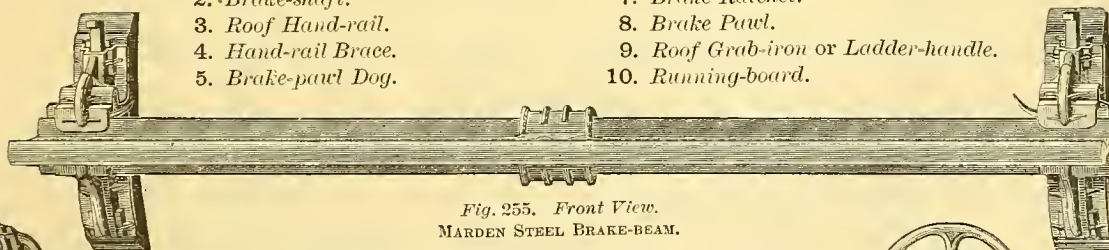


Fig. 255. Front View.  
MARDEN STEEL BRAKE-BEAM.

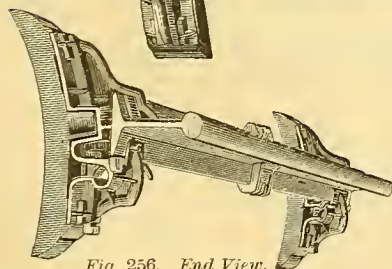


Fig. 256. End View.



Fig. 257. BRAKE-WHEEL.

(Sometimes on coal cars and elsewhere a mere bent rod, as shown in Fig. 109.)

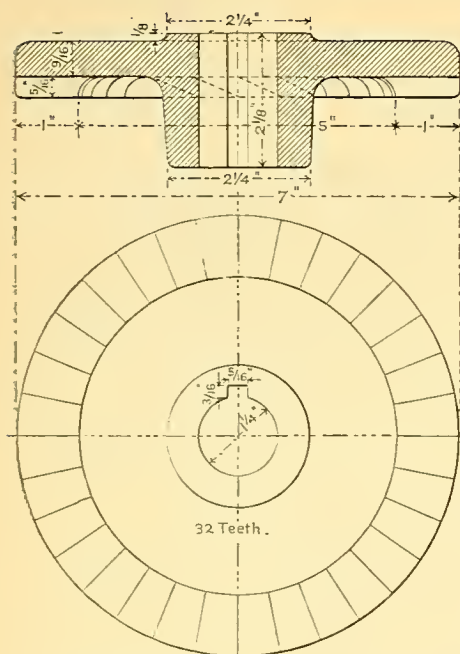


Fig. 258.  
RATCHET-WHEEL.

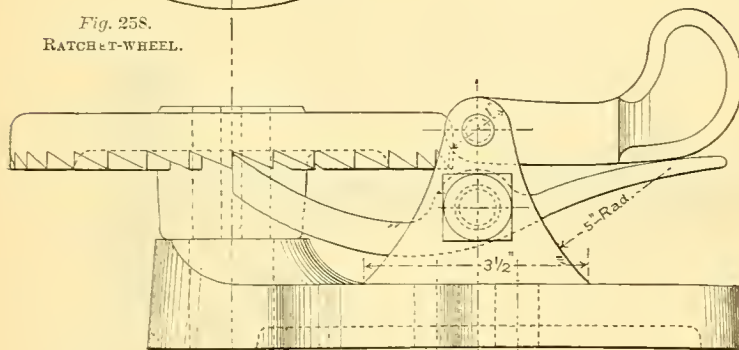


Fig. 260. Elevation.  
BRAKE RATCHET GEAR, COMPLETE.

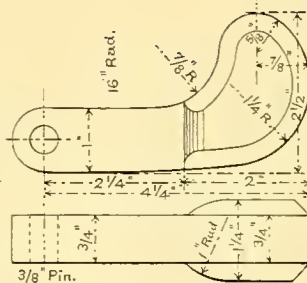


Fig. 259.  
BRAKE-PAWL DOG.

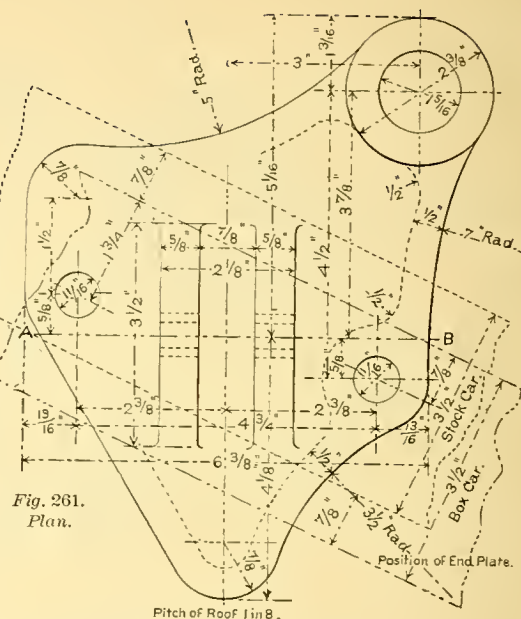


Fig. 261.  
Plan.

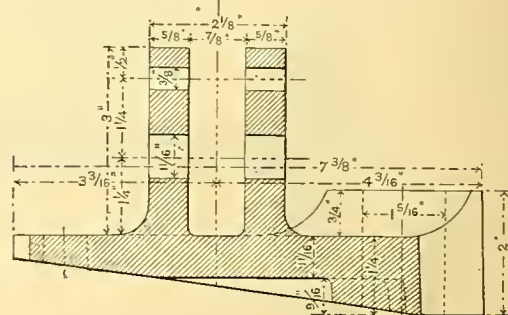


Fig. 262. Section.  
BRAKE-PAWL CARRIER.

Figs. 258-262. ENLARGED VIEW OF BRAKE-PAWL, BRAKE-PAWL CARRIER, BRAKE RATCHET-WHEEL AND BRAKE-PAWL DOG, shown on preceding page.

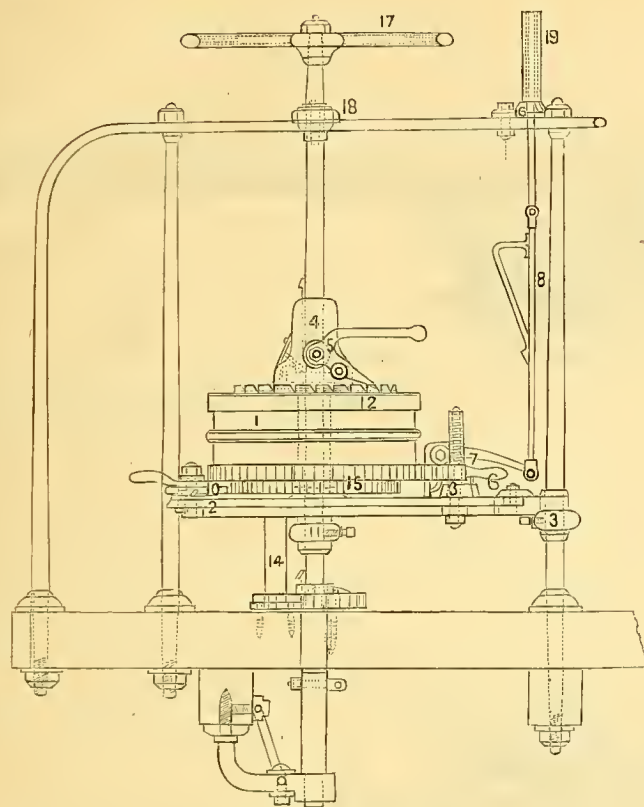


Fig. 263. End View.  
CREAMER BRAKE (Obsolete).

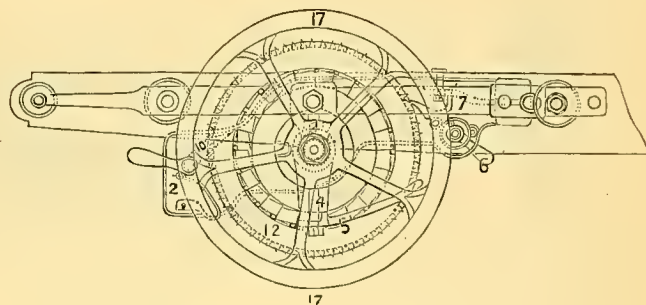


Fig. 264. CREAMER BRAKE. Plan.

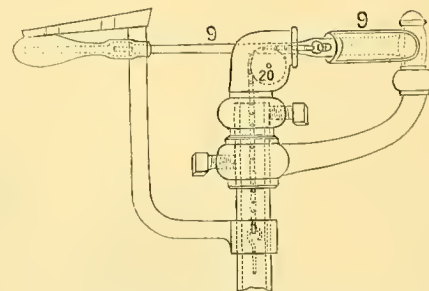


Fig. 265. Side View.  
ROOF-LEVER, FOR CREAMER BRAKE.

# NAMES OF PARTS, Figs. 263-265.

- |                       |                    |                                  |                                |
|-----------------------|--------------------|----------------------------------|--------------------------------|
| 1. Drum.              | 7. Tripping-lever. | 13. Stud, for Jointed Side-pawl. | 16. Pipe-stay.                 |
| 2. Cross-bar.         | 8. Connecting-rod. | 14. Standard, for Cross-bar.     | 17. Brake-wheel.               |
| 3. Post-bracket.      | 9. Roof-lever.     | 15. Bottom - ratchet of Drum.    | 18. Upper Brake-shaft Bearing. |
| 4. Top-arm.           | 10. Side-pawl.     |                                  | 19. Guard-pipe.                |
| 5. Jointed Top-pawl.  | 11. Collar.        |                                  | 20. Clutch-pulley.             |
| 6. Jointed Side-pawl. | 12. Drum-cover.    |                                  |                                |



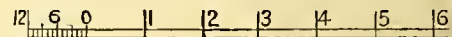
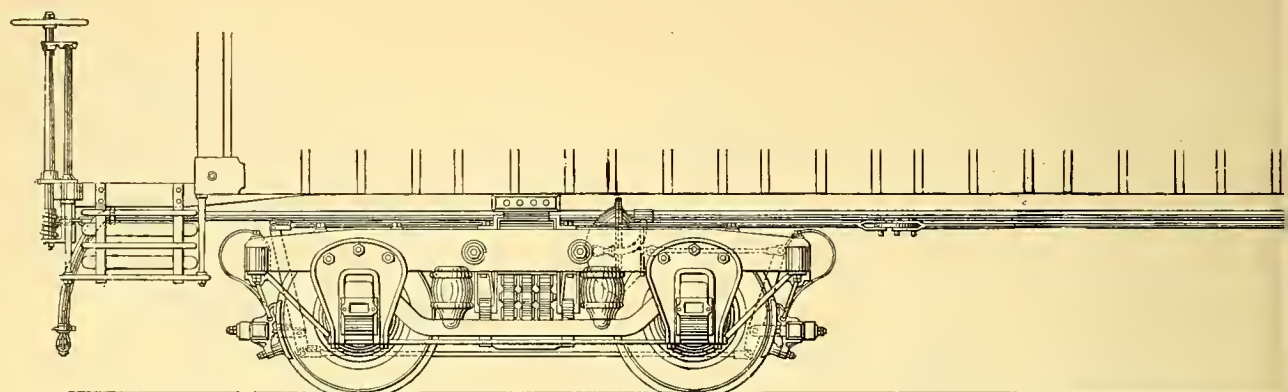
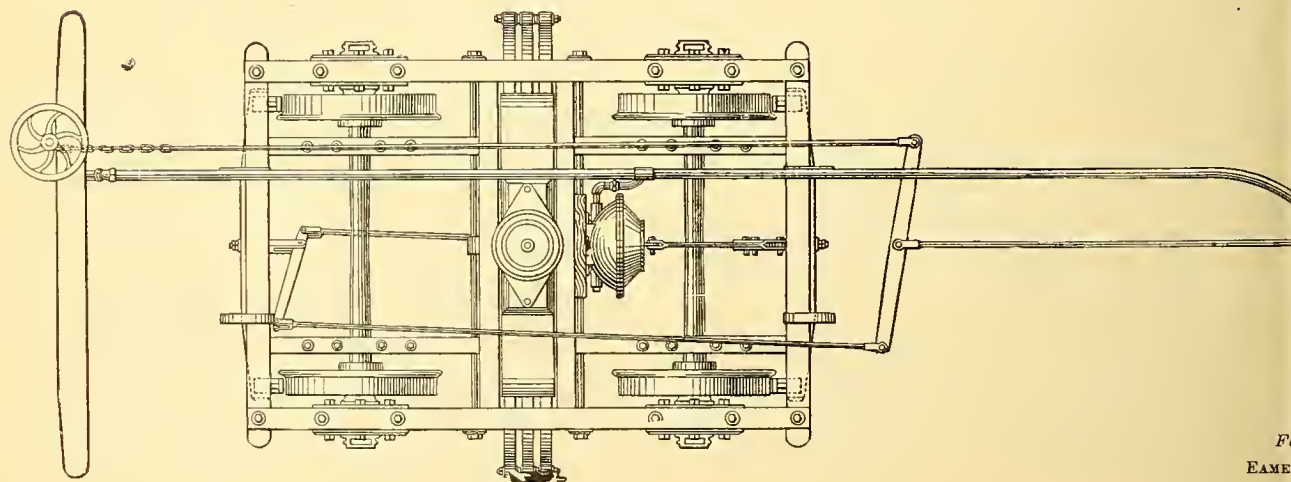
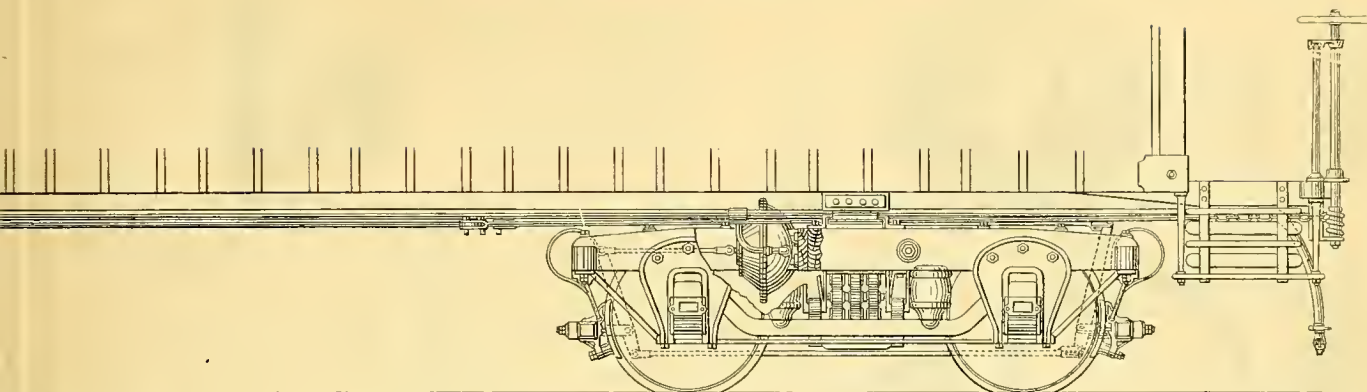


Fig.

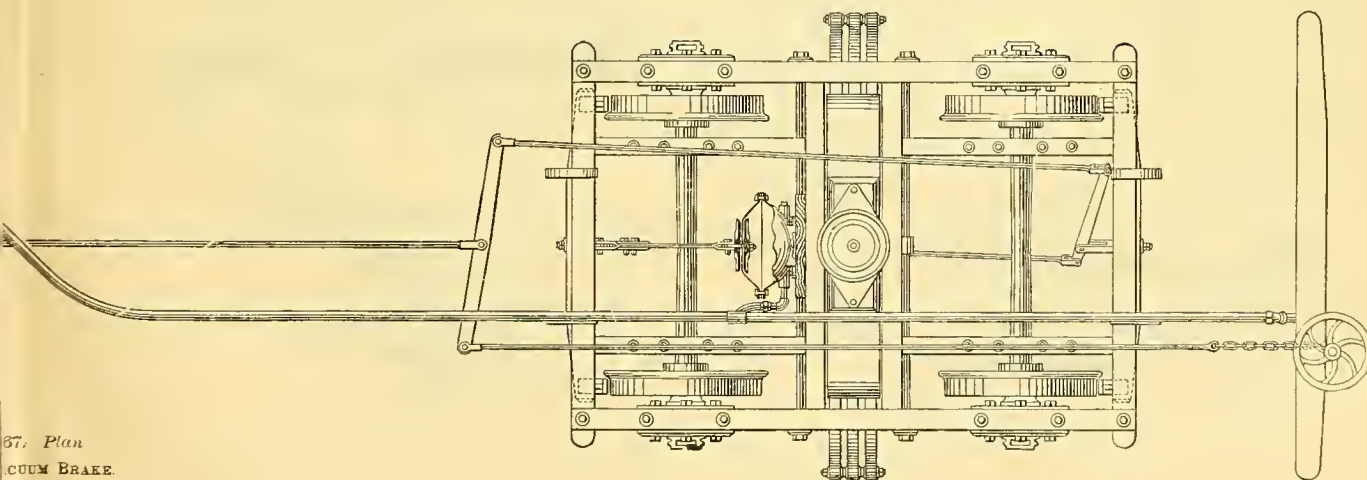


Fi  
EAMES



Scale.  
7 8 9 10 11 12 13 14 15 ft.

3. Side View.



37. Plan  
VACUUM BRAKE.





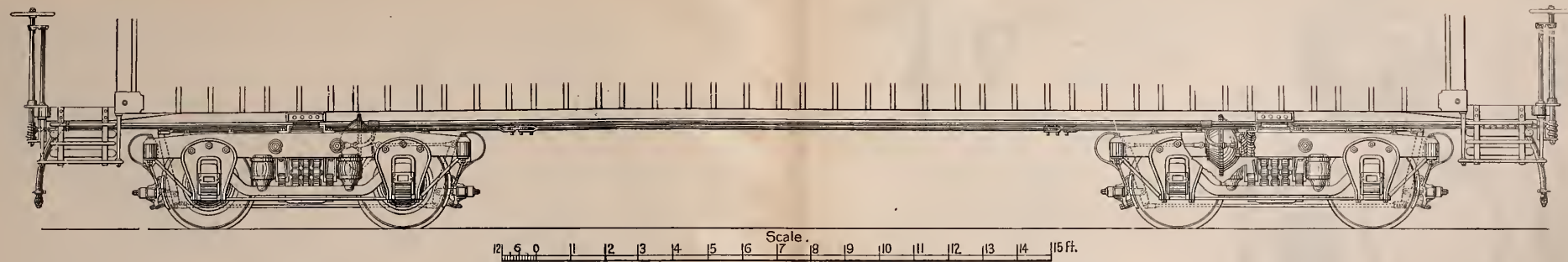


Fig. 266. Side View.

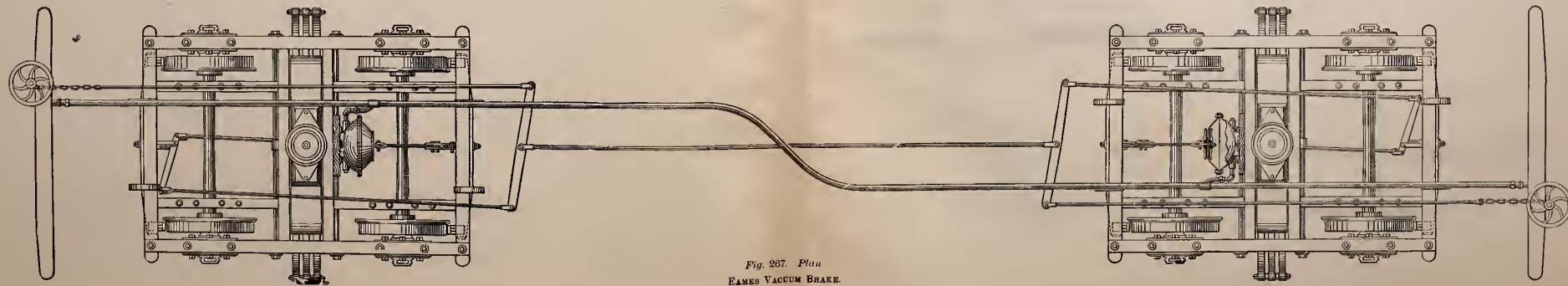


Fig. 267. Plan  
EAMES VACUUM BRAKE.

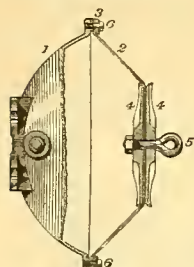


Fig. 268.

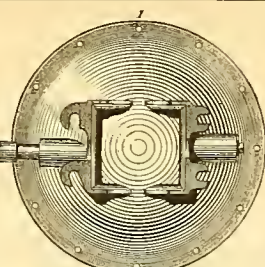


Fig. 269.

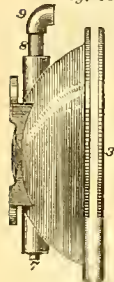


Fig. 270.

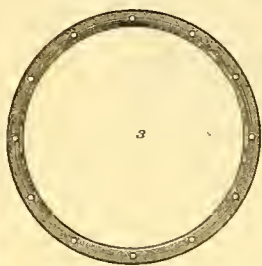


Fig. 271.

DIAPHRAGM FOR EAMES BRAKE.

NAMES OF PARTS OF DIAPHRAGM AND BRAKE-HOSE;

Figs. 268-273 and 280-281.

1. Diaphragm-shell
2. Diaphragm-rubber
3. Diaphragm-ring
4. Diaphragm-washers
5. Diaphragm eye-bolt
6. Diaphragm Cap Screws
7. Diaphragm Plug
8. Double-thread Nipple ( $1\frac{1}{2} \times 3\frac{1}{2}$  in.).
9. Elbow ( $1\frac{1}{2}$  in.).
10. Hose-nipple ( $1\frac{1}{2} \times 3\frac{1}{2}$  in.).
11. Tee ( $1\frac{1}{2} \times 1\frac{1}{2}$  in.).
12. Hose-clip, Plain ( $1\frac{1}{2}$  in.).
13. Diaphragm-hose ( $1\frac{1}{2} \times 19$  in.).

Constituting  
Diaphragm  
Complete.

14. Coupling-hose ( $1\frac{1}{2} \times 22$  in.) (Details, Figs. 276-279).
15. Coupling ( $1\frac{1}{2}$  in.).
16. Goose-neck.
17. Hose-clip, Eye ( $1\frac{1}{2}$  in.).
18. Hose-clip, Plain ( $1\frac{1}{2}$  in.).
20. Coach-screw ( $3\frac{1}{2} \times 9-16$  in.).
21. Coach-screw ( $2 \times \frac{9}{16}$  in.).
22. Pipe-clip ( $1\frac{1}{2}$  in.).

Fig. 280.

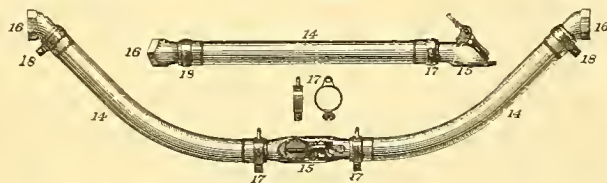


Fig. 281.

EAMES BRAKE-HOSE.

NAMES OF PARTS OF COUPLING: Figs. 276-279.

1. Coupling-valve. 2. Coupling-valve Lever. 3. Coupling-point. 4. Coupling-ears. 5. Coupling-gaskets. 6. Coupling-spring.
- (The reference numbers are the same as used in the makers' lists.)



Fig. 272.

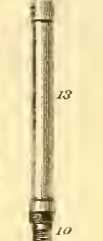


Fig. 273.

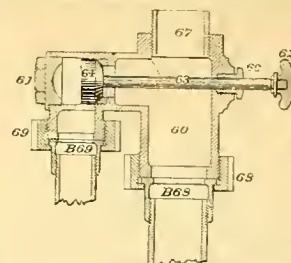


Fig. 274. Section.

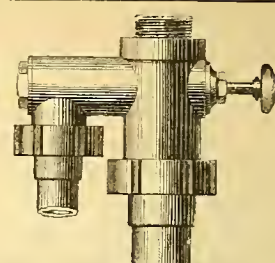


Fig. 275. Elevation.

EAMES DIVIDING ATTACHMENT, for Engines fitted with Drum Brakes.

NAMES OF PARTS OF DIVIDING ATTACHMENT; Figs. 274-275.

- |                 |                 |  |
|-----------------|-----------------|--|
| 60. Body.       | 64. Valve.      | 68. Union-nut ( $1\frac{1}{2}$ in.).   |
| 61. Cap.        | 65. Valve-seat. | B68. Union-part ( $1\frac{1}{2}$ in.). |
| 62. Valve-knob. | 66. Gland.      | 69. Union-nut (1 in.).                 |
| 63. Valve-stem. | 67. Nipple.     | B69. Union-part (1 in.).               |

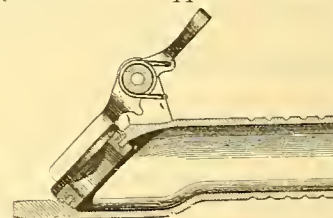


Fig. 276. Longitudinal Section.



Fig. 277. End Elevation.

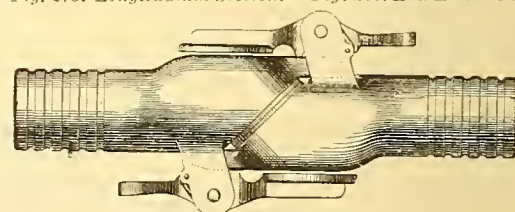


Fig. 278. Side Elevation.

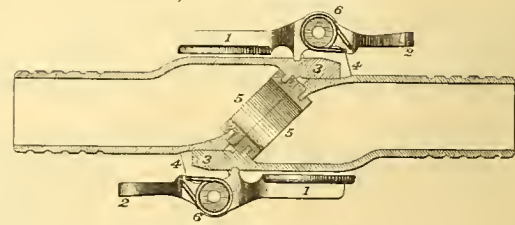


Fig. 279. Longitudinal Section.  
EAMES BRAKE-HOSE COUPLING.

## NAMES OF PARTS OF EJECTOR : Figs. 282-288.

- A1. Steam-body.  
 D2. Air-body.  
 3. Upper Body.  
 C4. Release-valve Body.  
 5. Main Air-tube.  
 6. Upper Air-tube.

- A7. Air Check-valve Seat.  
 B7. Air Check-valve.  
 8. Release-valve.  
 A8. Release-valve Seat.  
 10. Steam Spammer-nut.  
 12. Union-nut.

13. Release-lever Fulcrum.  
 B16. Ball Drip-valve Body.  
 17. Release-valve Stud.  
 18. Release-valve Nut.  
 20. Fulcrum-pin.  
 22. Handle Nut.

23. Handle Ferrule.  
 24. Handle.  
 25. Release-lever.  
 B28. Steam-valve Body.  
 A29. Steam-valve Nut.  
 A30. Lever-quadrant.  
 36. Top Tube.  
 41. Steam-valve Lever.  
 42. Lever-quadrant Stud.  
 43. Lever-quadrant Nut.  
 44. Valve stem Nut.  
 A47. Base-cap Screw.  
 48. Steam-valve Gland.  
 B49. Steam-valve.  
 C49. Steam-valve Seat.  
 50. Ball Joint (for 1 in. Steam-pipe).  
 B51. Steam-valve Stem.  
 53. Exhaust-pipe.  
 54. Nipple.  
 B55. Union-part.  
 56. Drip-valve Body.  
 57. Drip-valve Cap.  
 58. Drip-valve.  
 59. Drip-valve Ball.

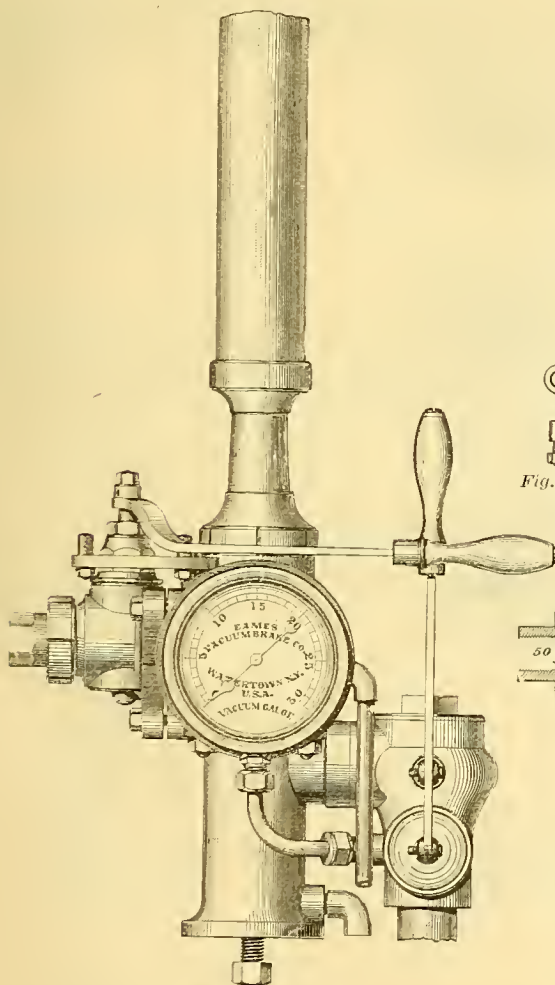


Fig. 282. Elevation.

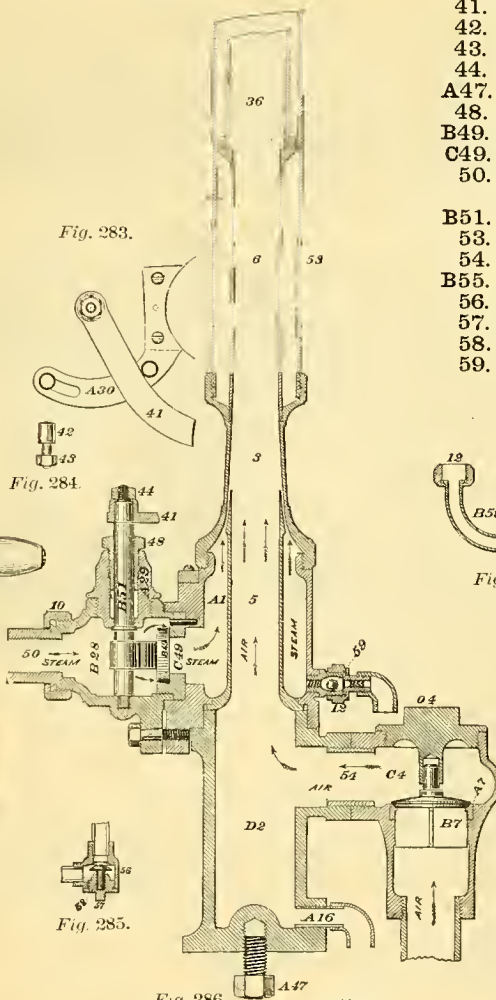


Fig. 286. Section.

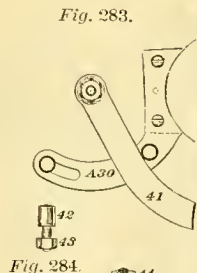


Fig. 284.

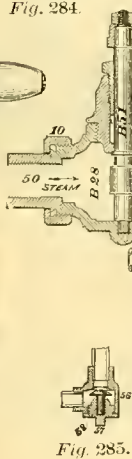


Fig. 285.



Fig. 287.

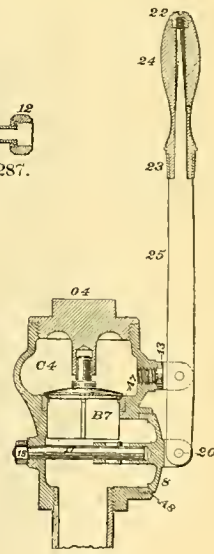
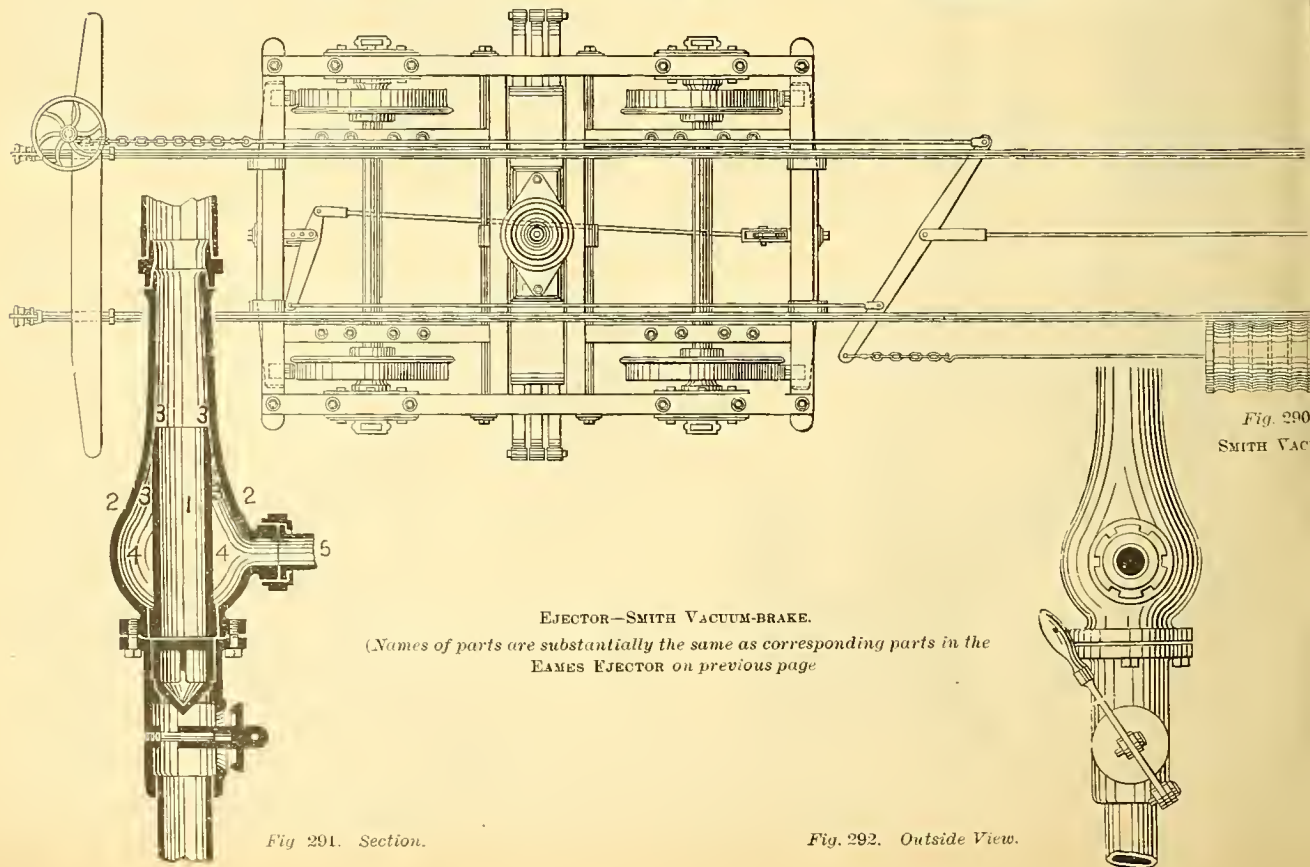
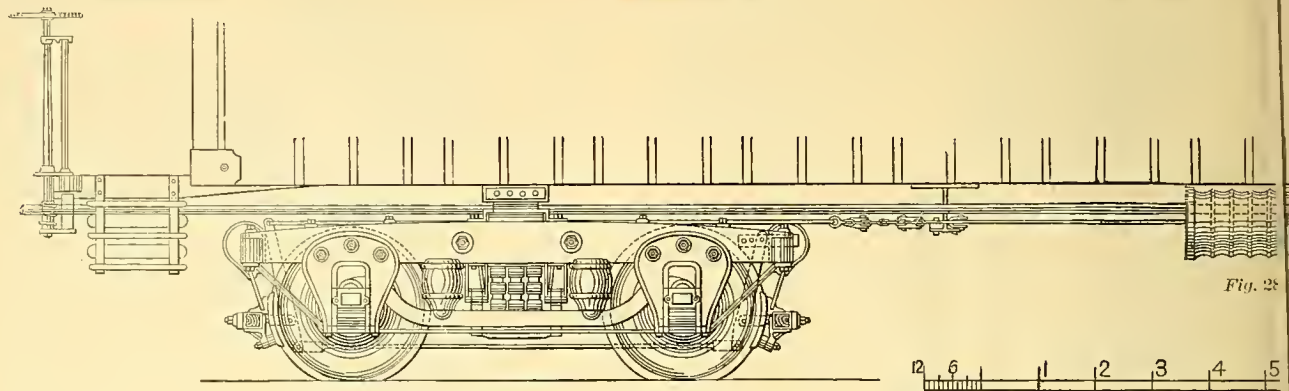


Fig. 288.

EAMES EJECTOR.

(The reference numbers are the same as used in the makers' lists.)



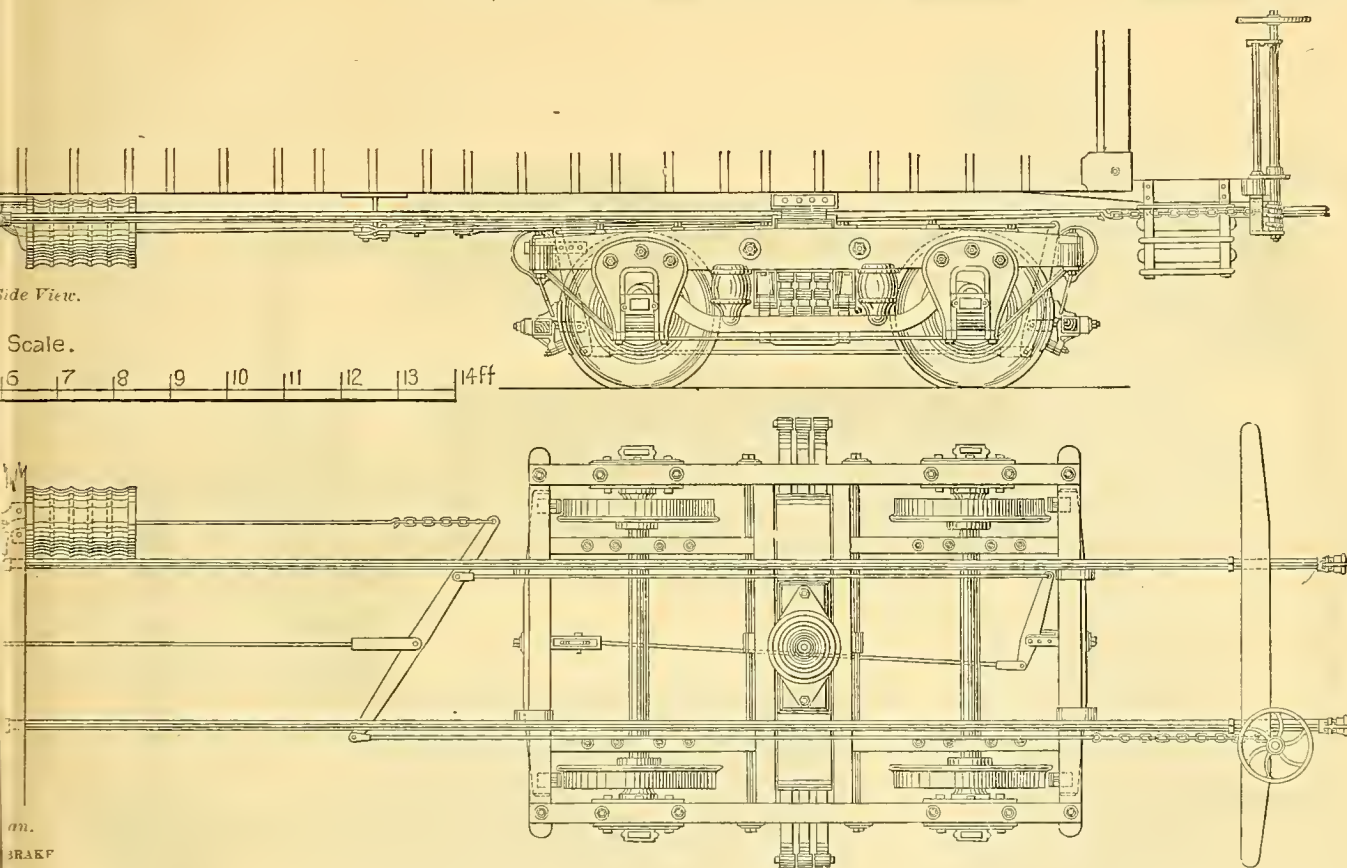


EJECTOR—SMITH VACUUM-BRAKE.

(Names of parts are substantially the same as corresponding parts in the EAMES EJECTOR on previous page)

Fig. 291. Section.

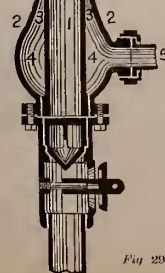
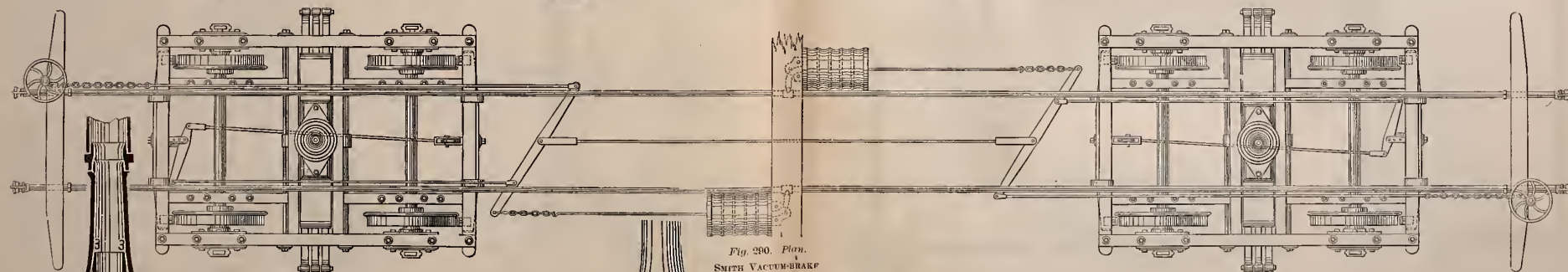
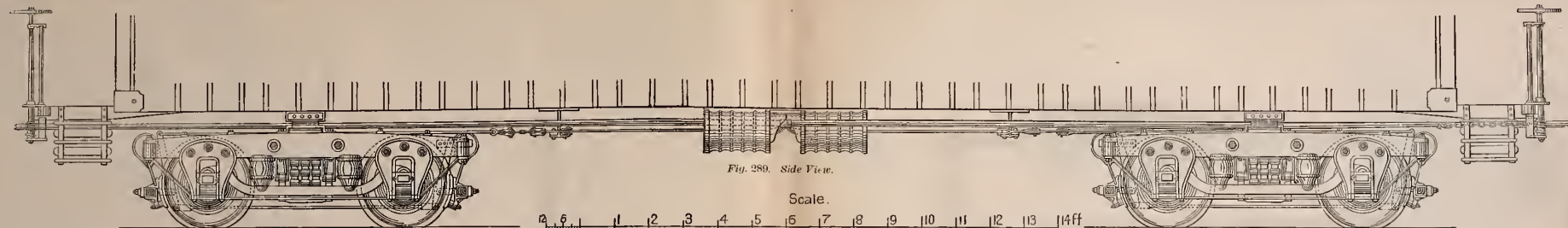
Fig. 292. Outside View.



NOTE.—The Smith Vacuum-brake is in use on but one road in this country, the LONG ISLAND RAILROAD but is in extended use in Eng<sup>d</sup> and in a somewhat modified form.







EJECTOR-SMITH VACUUM-BRAKE.  
(Names of parts are substantially the same as corresponding parts in the  
EAMES EJECTOR on previous page)

Fig. 292. Outside View.



NOTE.—The Smith Vacuum-brake is in use on but one road in this country, the LONG ISLAND RAILROAD but is in extended use in Eng<sup>d</sup> and in a somewhat modified form.

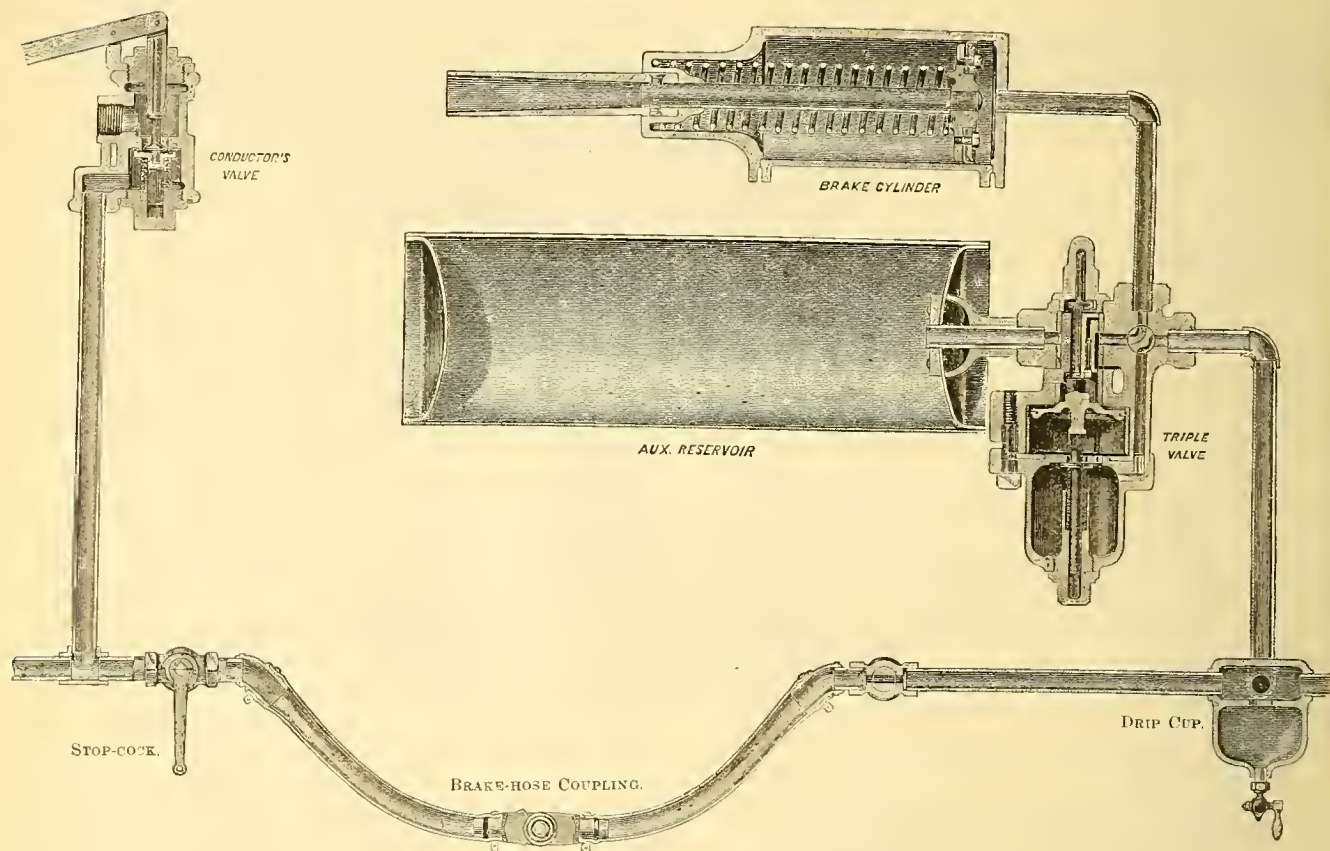


Fig. 293.

The above Parts are shown in detail as follows :

Coupling, Figs. 327-328.  
 Brake-cylinder, Fig. 329.  
 Auxiliary Reservoir, Fig. 326.

Triple Valve, Figs. 326-332  
 Engineer's Brake Valve, Fig. 334.

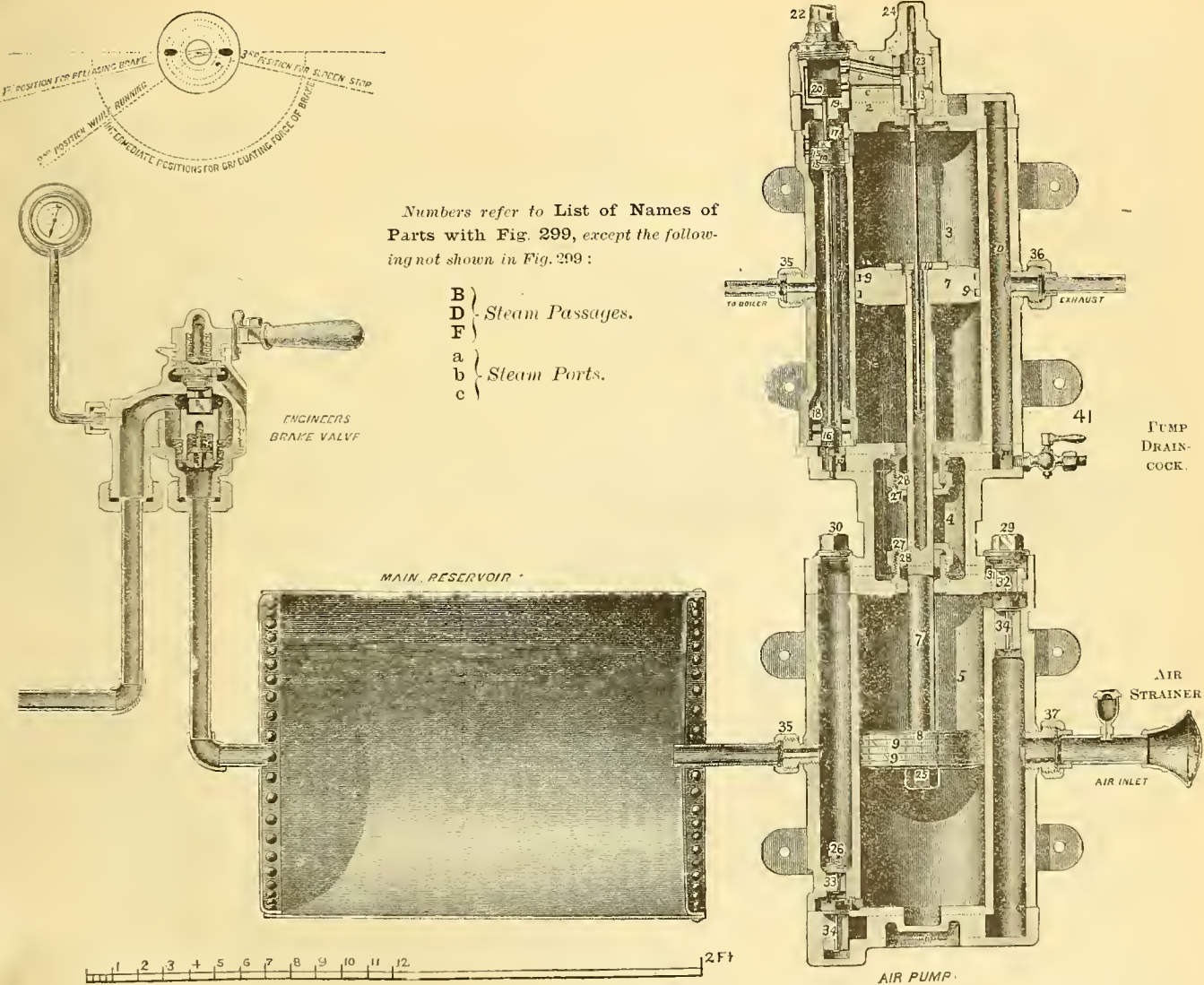


Fig. 294.

SHOWING THE RELATION OF THE VARIOUS PARTS TO EACH OTHER



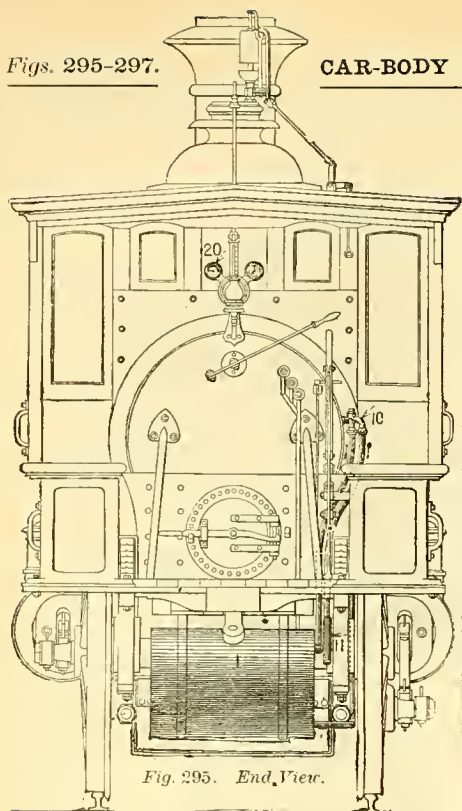


Fig. 295. End View.

WESTINGHOUSE AUTOMATIC  
BRAKE  
AS APPLIED TO ENGINE AND TENDER.

(Locomotive Driver Brake shown more fully  
in Figs. 322-323.)

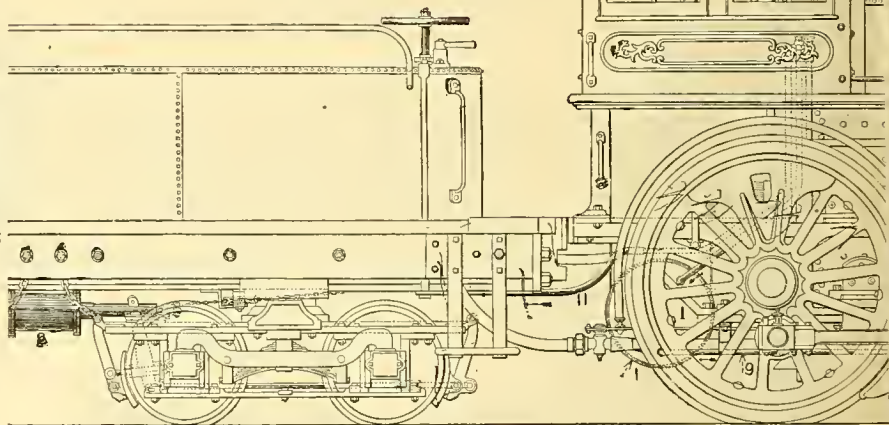


Fig.

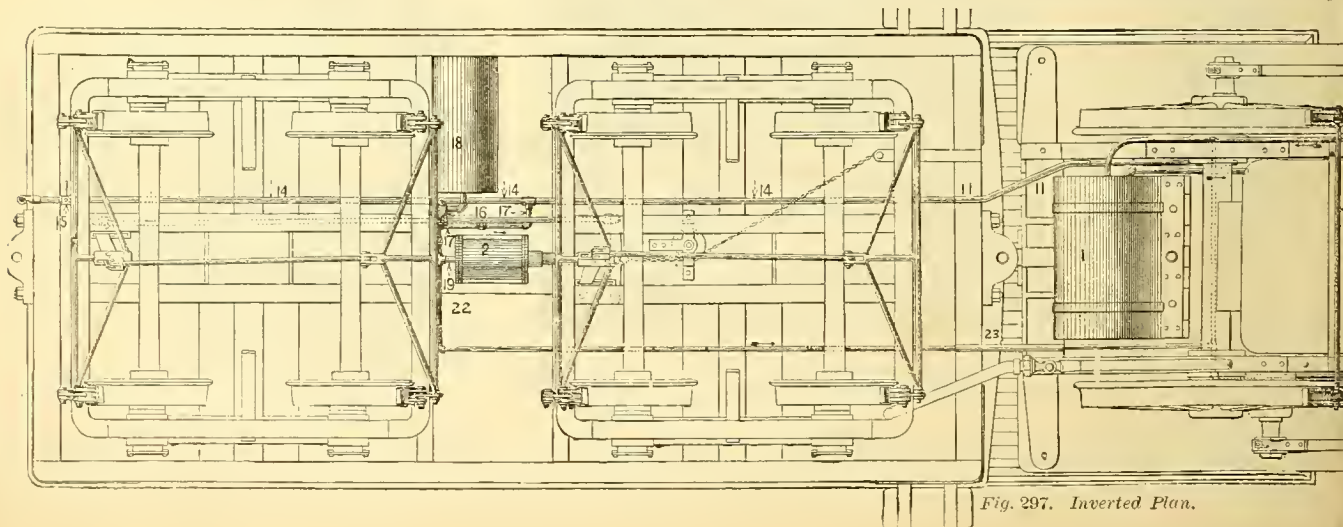
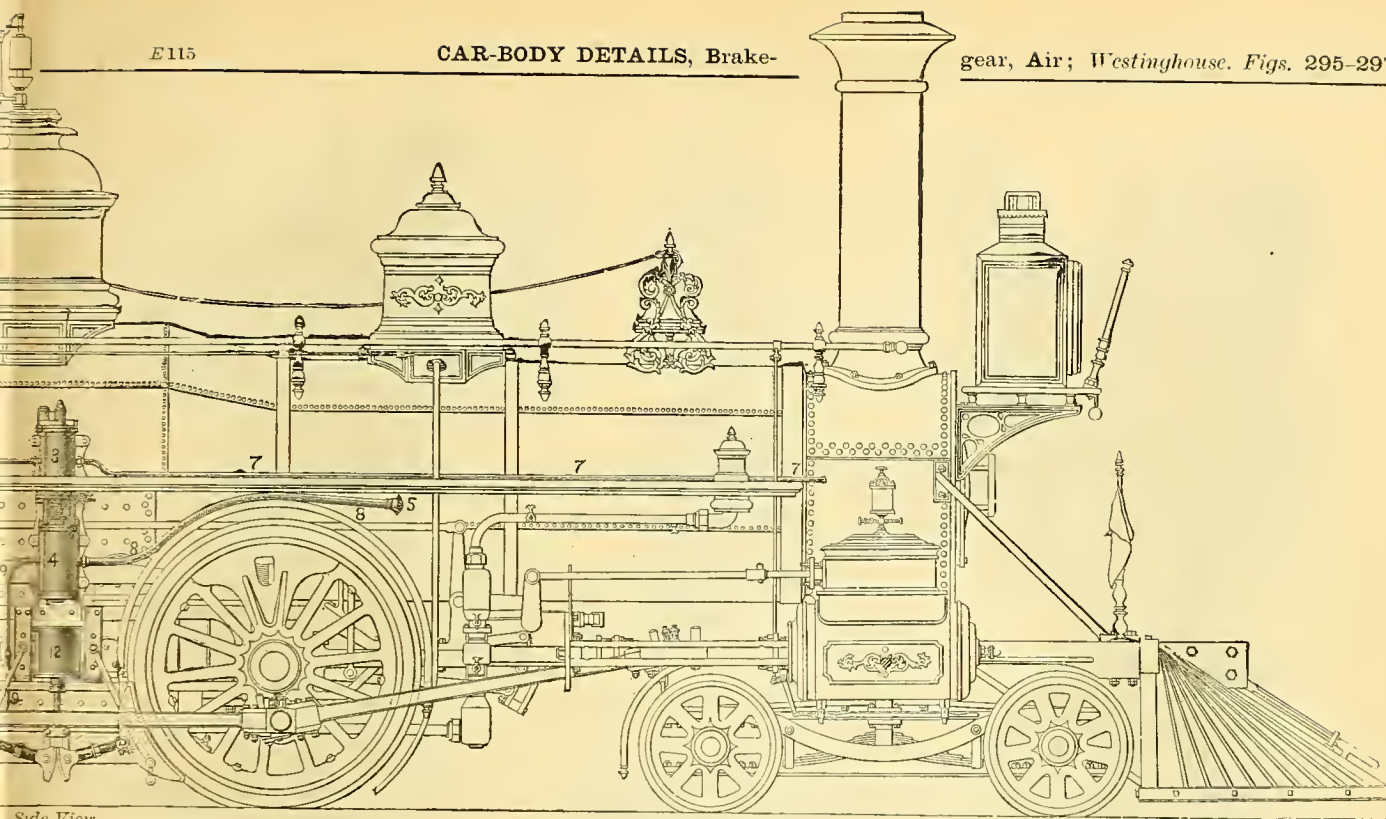
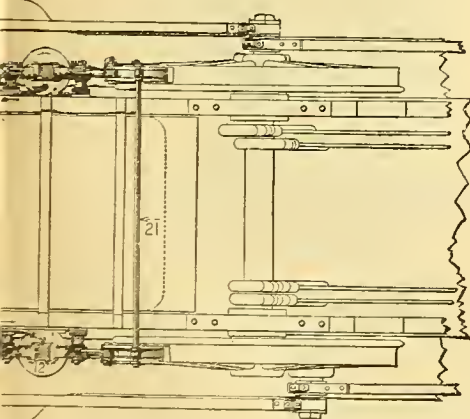


Fig. 297. Inverted Plan.



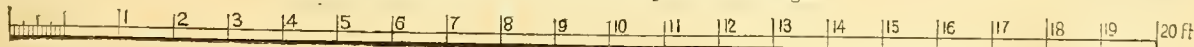
Side View.

NAMES OF PARTS OF WESTINGHOUSE-BRAKE ATTACHED TO LOCOMOTIVE AND TENDER;  
Figs. 295-297.



- |                                       |                                   |
|---------------------------------------|-----------------------------------|
| 1. Main Reservoir.                    | 12. Driving-wheel Brake cylinder. |
| 2. Brake-cylinder, for Tender-brake.  | 13. Throttle-valve.               |
| 3. 4. Engine and Air-pump.            | 14. Brake-pipe.                   |
| 3. Steam-cylinder.                    | 15. Stop-cock.                    |
| 4. Air-cylinder.                      | 16. Triple-valve.                 |
| 5. Air-strainer.                      | 17. Triple-valve Branch-pipe.     |
| 6. Steam-pipe.                        | 18. Auxiliary-reservoir.          |
| 7. Exhaust-pipe.                      | 19. Brake-cylinder Pipe.          |
| 8. Supply-pipe, or Air-inlet.         | 20. Air-gauge.                    |
| 9. Discharge-pipe, or Reservoir-pipe. | 21. Brake-block Tie-rod.          |
| 10. Three-way Cock.                   | 22. Driver-brake Pipe.            |
| 11. Tender Brake hose.                | 23. Driver-brake Hose.            |

NOTE.—In Fig. 297 the driver-brake is shown operated from the triple-valve on the tender, which is the arrangement in general use. The latest and most approved design, however, is to operate the driver-brake from a triple-valve and separate reservoir placed on the engine.







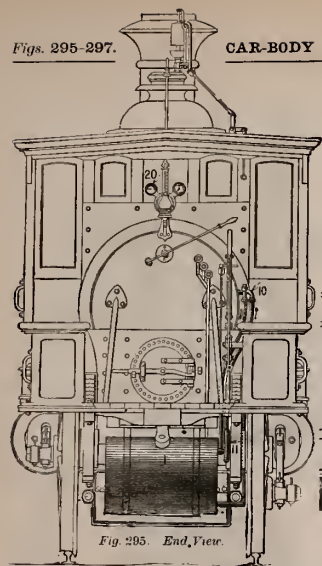


Fig. 295. End View.

WESTINGHOUSE AUTOMATIC  
BRAKE  
AS APPLIED TO ENGINE AND TENDER.  
(Locomotive Driver Brake shown more fully  
in Figs. 322-323.)

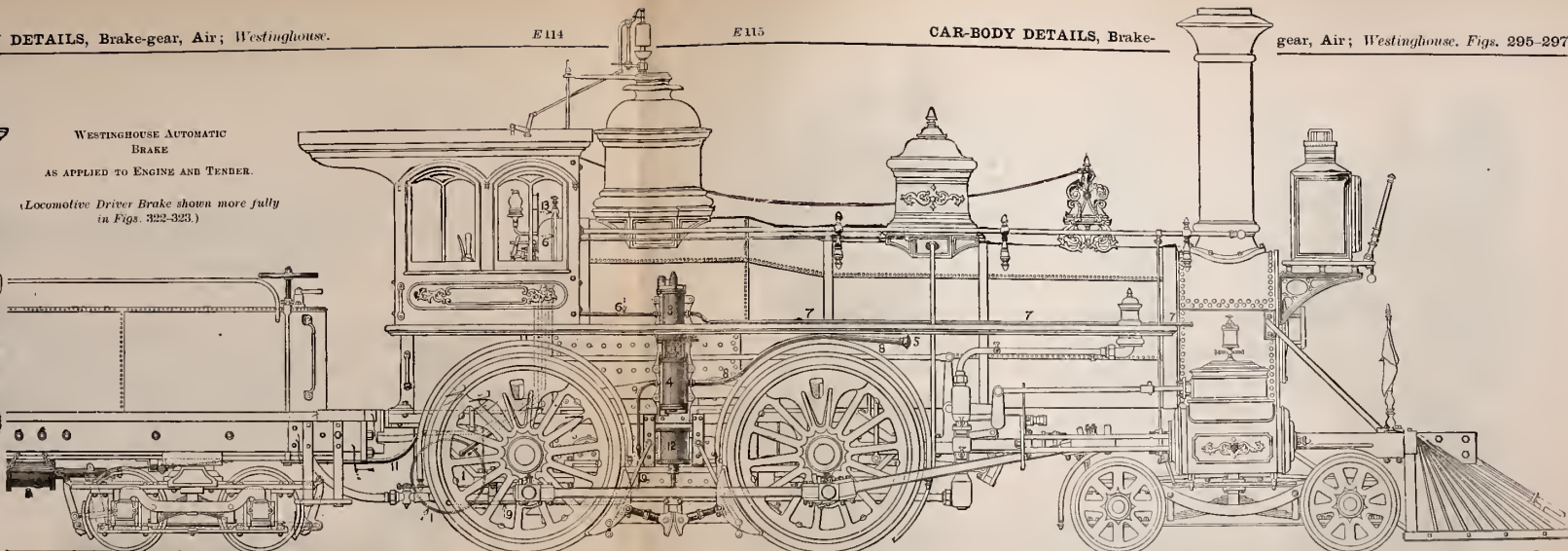


Fig. 296. Side View.

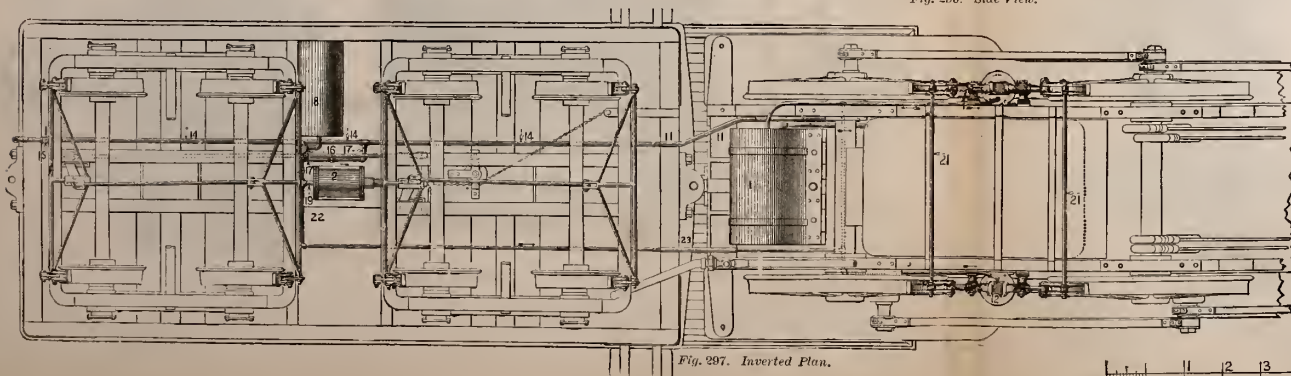


Fig. 297. Inverted Plan.

NAMES OF PARTS OF WESTINGHOUSE-BRAKE ATTACHED TO LOCOMOTIVE AND TENDER;  
Figs. 295-297.

- |  |                                   |
|--|-----------------------------------|
| 1. Main Reservoir.                     | 12. Driving-wheel Brake cylinder. |
| 2. Brake-cylinder, for Tender-brake.   | 13. Throttle-valve.               |
| 3. 4. Engine and Air-pump.             | 14. Brake-pipe.                   |
| 5. Steam-cylinder.                     | 15. Stop-cock.                    |
| 6. Air-cylinder.                       | 16. Triple-valve.                 |
| 7. Air-strainer.                       | 17. Triple-valve Branch-pipe.     |
| 8. Steam-pipe.                         | 18. Auxiliary-reservoir.          |
| 9. Exhaust-pipe.                       | 19. Brake-cylinder Pipe.          |
| 10. Supply-pipe, or Air-inlet.         | 20. Air-gauge.                    |
| 11. Discharge-pipe, or Reservoir-pipe. | 21. Brake-block Tie-rod.          |
| 12. Three-way Cock.                    | 22. Driver-brake Pipe.            |
| 13. Tender Brake hose.                 | 23. Driver-brake Hose.            |

NOTE.—In Fig. 297 the driver-brake is shown operated from the triple-valve on the tender, which is the arrangement in general use. The latest and most approved design, however, is to operate the driver-brake from a triple-valve and separate reservoir placed on the engine.



WESTINGHOUSE AIR-PUMPS AND ENGINE  
COMPLETE.

NAMES OF PARTS : Fig. 298 (and 299).  
(Figures in parentheses refer to Fig. 299.)

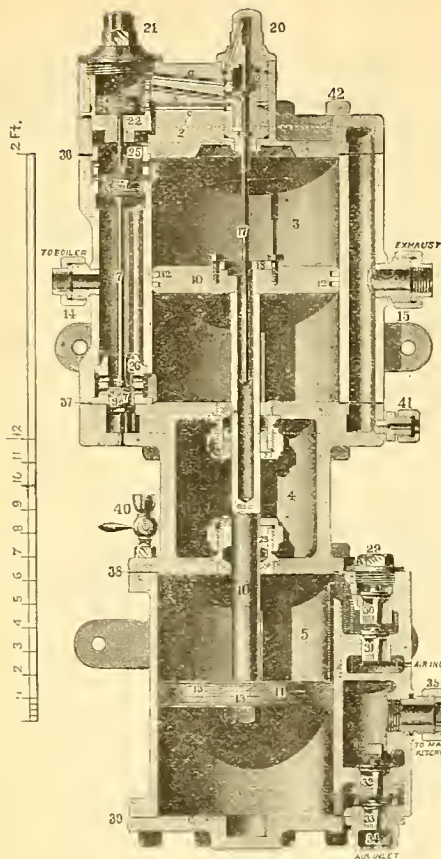


Fig. 298. EIGHT-INCH AIR-PUMP.  
(Extra size, for freight service.)

- 23. Reversing-piston. (20)
- 24. Reversing-piston Packing-ring. (21)
- 25. Upper Main-valve Bush. (17)
- 26. Lower Main-valve Bush. (18)
- 27. Piston-rod Packing-nut. (27)
- 28. Piston-rod Packing-gland. (28)
- 29. Right or Upper-valve Chamber Cap. (29)
- Left Chamber Cap. (30)

- 2. Steam-cylinder Head (carrying Reversing-cylinder, Reversing-piston and Reversing-valve Bushes). (2)
- 3. Steam-cylinder (carrying Main Valve and Bushes). (3)
- 4. Centre-piece. (4)
- 5. Air-cylinder (carrying Lower Discharge-valve). (5)
- 6. Air-cylinder Head. (6)
- 7. Main-valve (upper and lower). (14)
- 8. Upper Main-valve Packing-ring. (15)
- 9. Lower Main-valve Packing-ring. (16)
- 10. Steam-piston and Piston-rod. (7)
- 11. Air-piston. (8)
- 12. Steam-piston Packing-ring. (9)
- 13. Air-piston Packing-ring. (9)
- 14. Steam-pipe Union. (35)
- 15. Exhaust-pipe Union. (36)
- 16. Reversing-valve. (13)
- 17. Reversing-valve Stem. (12)
- 18. Reversing-valve Plate. (10)
- 19. Reversing-valve Bush. (23)
- 20. Reversing-valve Chamber Cap. (24)
- 21. Reversing-cylinder Cap. (22)
- 22. Reversing-cylinder. (19)

- 30. Upper Discharge-valve. (32)
- 31. Upper Receiving-valve. (34)
- 32. Lower Discharge-valve. (33)
- 33. Lower Receiving-valve. (34)
- 34. Lower Valve-chamber Cap. (not shown.)
- 35. Reservoir Union. (37)
- 36. Upper Steam-cylinder Gasket. (40)
- 37. Lower Steam-cylinder Gasket. (41)

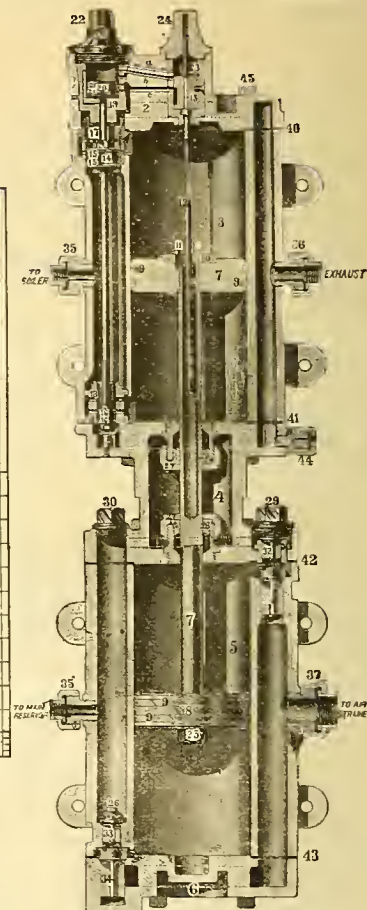


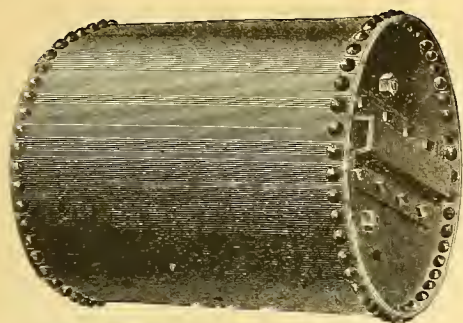
Fig. 299. STANDARD SIX-INCH AIR-PUMP.  
(For passenger service.)

- 38. Upper Air-cylinder Gasket. (42)
- 39. Lower Air-cylinder Gasket. (43)
- 40. Air-cylinder Oil-cup. (not shown.)
- 41. Drain-pipe Union. (44)
- 42. Cylinder-head Bolt. (45)
- Discharge-valve Stop-bolt. (26)
- Left Chamber Cap. (30)

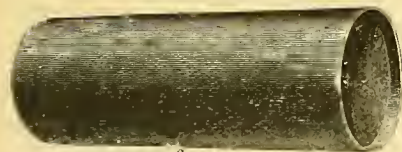
(The Narrow-gauge Air-pump (Fig. 306, outside view, not shown by section) is not only smaller, but differs somewhat in interior details of the Air-pump.)

(The reference numbers are the same as used in the makers' lists.)





1  
Fig. 300.  
(1.) MAIN RESERVOIR.



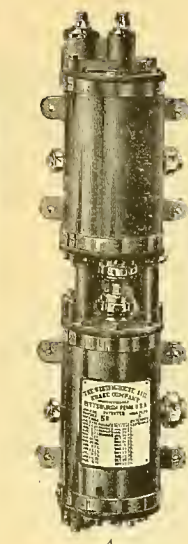
2  
Fig. 301.  
(2.) AUXILIARY RESERVOIR (12 by 33 in.).



3  
Fig. 302.  
(3.) AUXILIARY RESERVOIR (10 by 24 in.).



4  
Fig. 303.  
(7.) NARROW-GAUGE CAR-CYLINDER.  
(See Fig. 331.)



4  
Fig. 304.  
(4.) STANDARD (6 in.) AIR-PUMP.  
(See Fig. 299.)

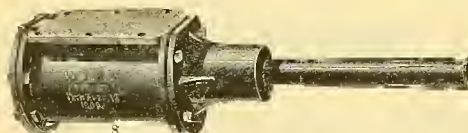
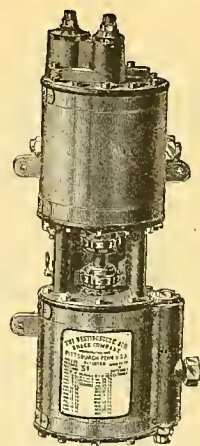


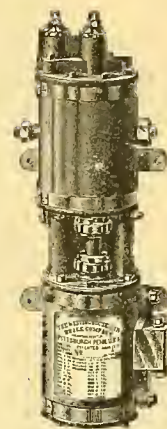
Fig. 307.  
(8.) TENDER CYLINDER.  
(See Fig. 330.)



9  
Fig. 309.  
(9.) STANDARD CAR-CYLINDER.  
(See Fig. 329.)



5  
Fig. 305.  
(5.) EIGHT-INCH AIR-PUMP.  
(See Fig. 298.)



6  
Fig. 306.  
(6.) NARROW-GAUGE AIR-PUMP.



10  
Fig. 308.  
(10.) STANDARD DRIVING-WHEEL  
BRAKE-CYLINDER.  
(See Fig. 314.)



11  
Fig. 310.  
(11.) NARROW-GAUGE DRIVING  
WHEEL BRAKE-CYLINDER.

*These parts are shown in service in Figs. 293-297 and 324-325.)*  
(The reference numbers in parentheses are those used in the makers' lists.)



## NAMES OF PARTS ; Fig. 311.

12. Engineer's Brake-valve (see Fig. 334)  
 13. Three-way Cock (see Fig. 318).  
 14. Air-gauge.  
 15. Automatic Lubricator.  
 16. Stop-cock,  $\frac{3}{4}$  in.  
 17. Pump Regulator (see Fig. 312).  
 18. Steam-valve.  
 19. Pump Drain-cock.  
 20. Air-cylinder Oil-cup.  
 21. Conductor's Valve (see Figs. 293, 324-5).  
 22. Triple-valve (see Fig. 332).  
 23. Triple-valve, with Brass Case (see Fig. 333).  
 24. Cylinder Release-cock (see Fig. 293.)  
 25. Air-pipe Strainer (see Fig. 296).  
 26. Tender Drain-cup.  
 27. Car Drain-cup.  
 28. Triple-valve Bracket.  
 29. Double-check Valve (see Fig. 313)  
 30.  $\frac{3}{4}$  in. Reservoir Union.  
 31. 1 in. Reservoir Union.  
 32. Discharge Valve-seat Wrench.  
 33. Auxiliary Brake-valve (see Fig. 350).  
 34. 1 in. Union (malleable).  
 35.  $\frac{3}{4}$  in. Union (malleable).  
 36.  $\frac{1}{2}$  in. Union (malleable).  
 37.  $\frac{1}{4}$  in. Union (malleable).  
 38.  $\frac{3}{4}$  in.  $\times$   $\frac{1}{2}$  in. T.  
 39.  $\frac{1}{2}$  in. T.  
 40.  $\frac{1}{2}$  in.  $\times$   $\frac{3}{8}$  in. T.  
 41.  $\frac{1}{2}$  in.  $\times$   $\frac{1}{4}$  in. T.  
 42. 1 in. L.  
 43.  $\frac{3}{4}$  in. L.  
 44.  $\frac{1}{2}$  in. L.  
 45.  $\frac{1}{4}$  in. L.  
 46.  $\frac{1}{2}$  in. Nipple.  
 47.  $\frac{3}{4}$  in. Nipple.  
 48. Coupling-valve Key.  
 49. Cap-screw Wrench.  
 50. Packing-nut Wrench.  
 51. Hose, Coupling and Nipple (Narrow-gauge).  
 52. Hose, Coupling and Nipple (Standard).  
 53. Driving-wheel Brake Hose.  
 54. Tender Hose.  
 55. 1 in. Cock.  
 56. Auxiliary Discharge-valve (see Fig. 351).

Fig. 311. Details.

(The reference numbers are the same as used in the makers' lists.)

## NAMES OF PARTS ; Fig. 312.

2. Regulator-body.
3. Lower Head.
4. Lower Cap.
5. Lower Valve.
6. Diaphragm.
7. Regulating-spring.
8. Regulating-nut.
9. Piston.
10. Piston Packing-ring.
11. Piston-spring.
12. Steam-valve.
13. Upper Spring.
14. Upper Cap.
15. Valve rod.
16. Union-nut.

(See note to Fig. 322.)

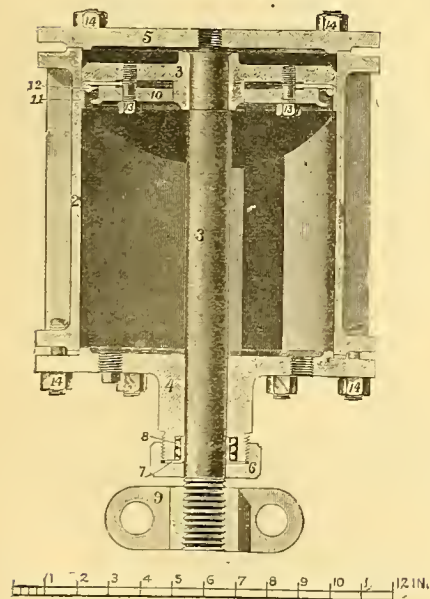


Fig. 314. STANDARD (EIGHT-INCH) BRAKE-CYLINDER,  
for DRIVING-WHEEL BRAKE.  
(External view, Fig. 308.)

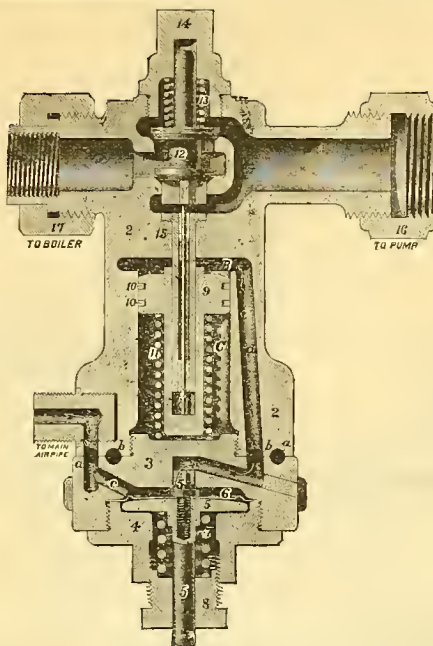


Fig. 312. PUMP REGULATOR.  
(Old style ; see Fig. 316 for improved form.)  
(External view ; 17, Fig. 311.)

## NAMES OF PARTS OF BRAKE-CYLINDERS ;

Figs. 314-15.

2. Cylinder-body.
3. Piston and Piston-rod.
4. Lower, or Bottom Cylinder-head.
5. Upper, or Top Cylinder-head.
6. Piston-rod Packing-nut.
7. Piston-rod Cup-leather.
8. Piston-rod Packing-spring.
9. Cross-head.
10. Piston Follower.
11. Piston Packing-leather.
12. Piston Packing-expander.
13. Piston Follower-bolt.
14. Cylinder Bolts.

(See note to Fig. 322.)

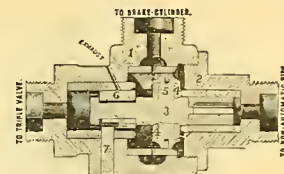


Fig. 313. Section.  
DOUBLE-CHECK VALVE (little used).  
External view ; 29, Fig. 311.

(Designed to be used in connection with the auxiliary brake-valve, Fig. 350, to connect the second line of "straight air" pipes with the brake-cylinders.)

## NAMES OF PARTS ; Fig. 313.

1. Valve-case.
2. Valve-case Cap.
3. Piston.
4. Valve-face.
5. Piston Packing ring.
6. Slide valve.
7. Slide-valve Guide.

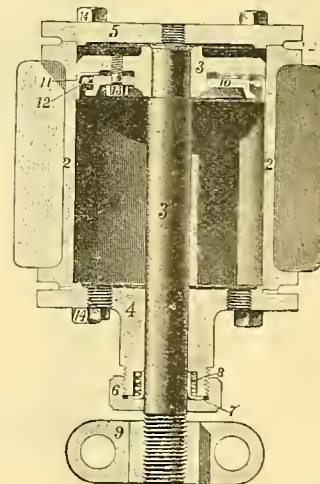


Fig. 315.  
SIX-INCH BRAKE-CYLINDER, for DRIVING-  
WHEEL BRAKE (Narrow Gauge).  
(External view, Fig. 310.)

(The reference numbers are the same as used in the makers' lists.)

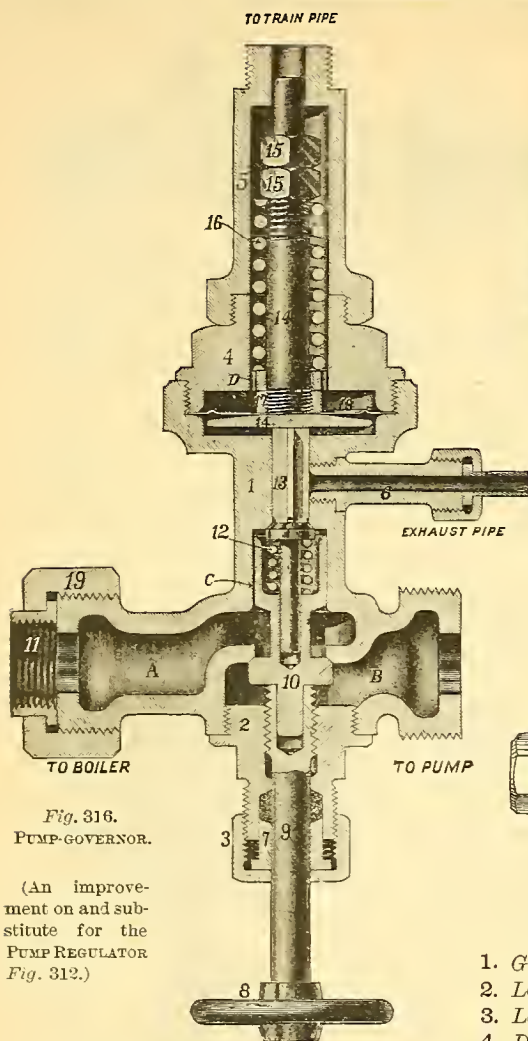


Fig. 316.  
PUMP-GOVERNOR.

(An improvement on and substitute for the PUMP REGULATOR Fig. 312.)

NAMES OF PARTS OF PUMP-GOVERNOR;  
Fig. 312.

- A. Steam-pipe.
- B. Air-pipe.
- C. Release-valve Pocket.
- D. Regulating-spring Collar.

- 1. Governor-body.
- 2. Lower Stud.
- 3. Lower-stud Nut.
- 4. Diaphragm Cap.
- 5. Spring-box.
- 6. Waste-pipe Stud.
- 7. Lower-stud Gland.
- 8. Valve-wheel.
- 9. Valve-stem.
- 10. Piston-valve.

(The reference numbers are the same as used in the makers' lists.)

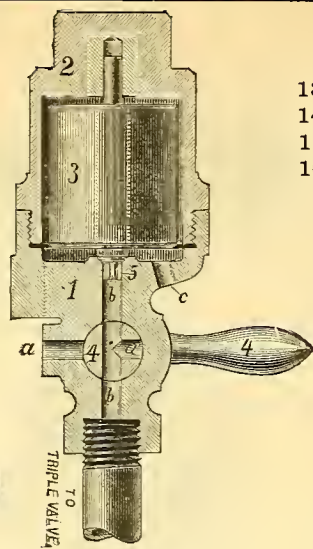


Fig. 317.  
PRESSURE-RETAINING VALVE.

- 13. Leakage-valve Cap.
- 14. Leakage-valve Plug.
- 15. Leakage-valve Case.
- 16. Rubber Seat.

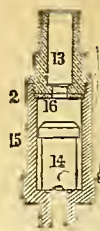


Fig. 320. LEAKAGE VALVE.  
(Obsolete; see Dictionary.)

NAMES OF PARTS: Fig. 317.

- 1. Pressure-valve Body.
- 2. Pressure-valve Cap.
- 3. Pressure-valve Weight.
- 4. Pressure-valve Key.
- 5. Pressure-valve Seat.

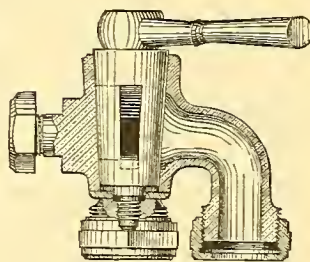
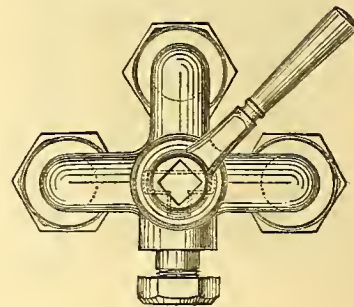


Fig. 318. Section.  
(Now becoming obsolete in favor of the ENGINEER'S BRAKE-VALVE, Fig. 334.)



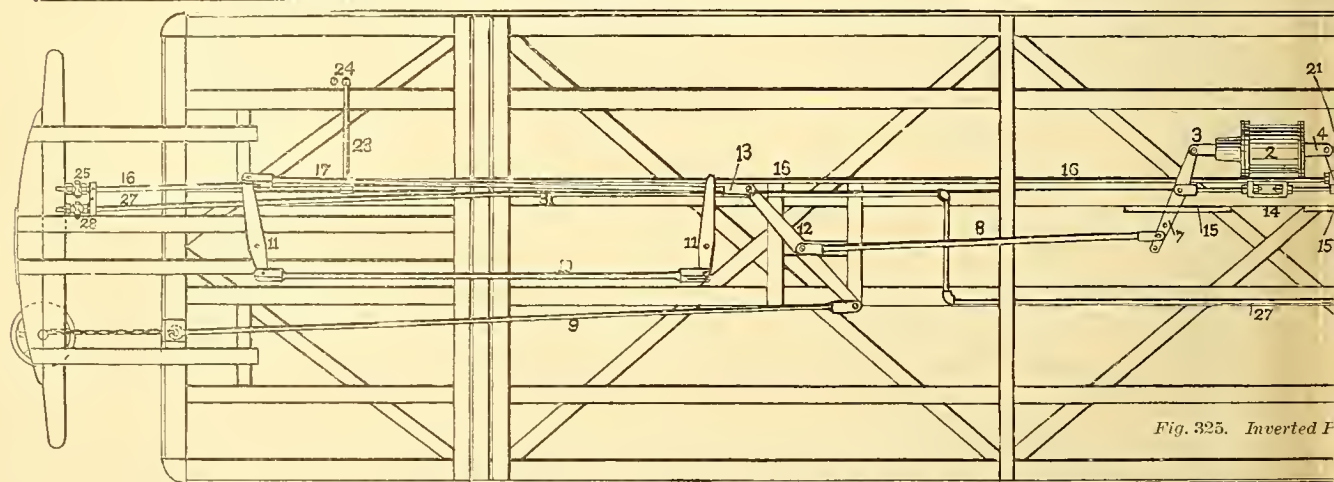
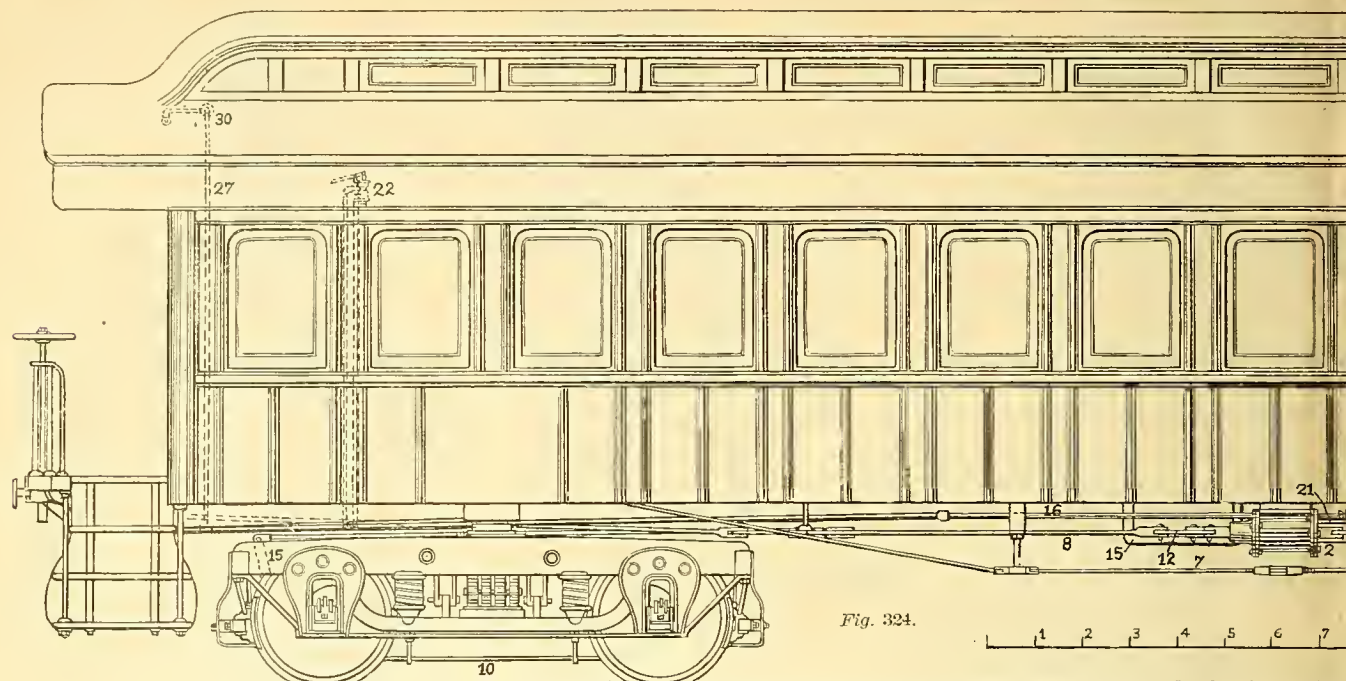
THREE-WAY COCK. Fig. 319. Plan.

- 11. Steam-pipe Swivel.
- 12. Release-valve Spring.
- 13. Release-valve.
- 14. Diaphragm Cap.
- 15. Regulating-nut.
- 16. Regulating-spring.
- 17. Diaphragm-nut.
- 18. Diaphragm-plate.
- 19. Union-nut.

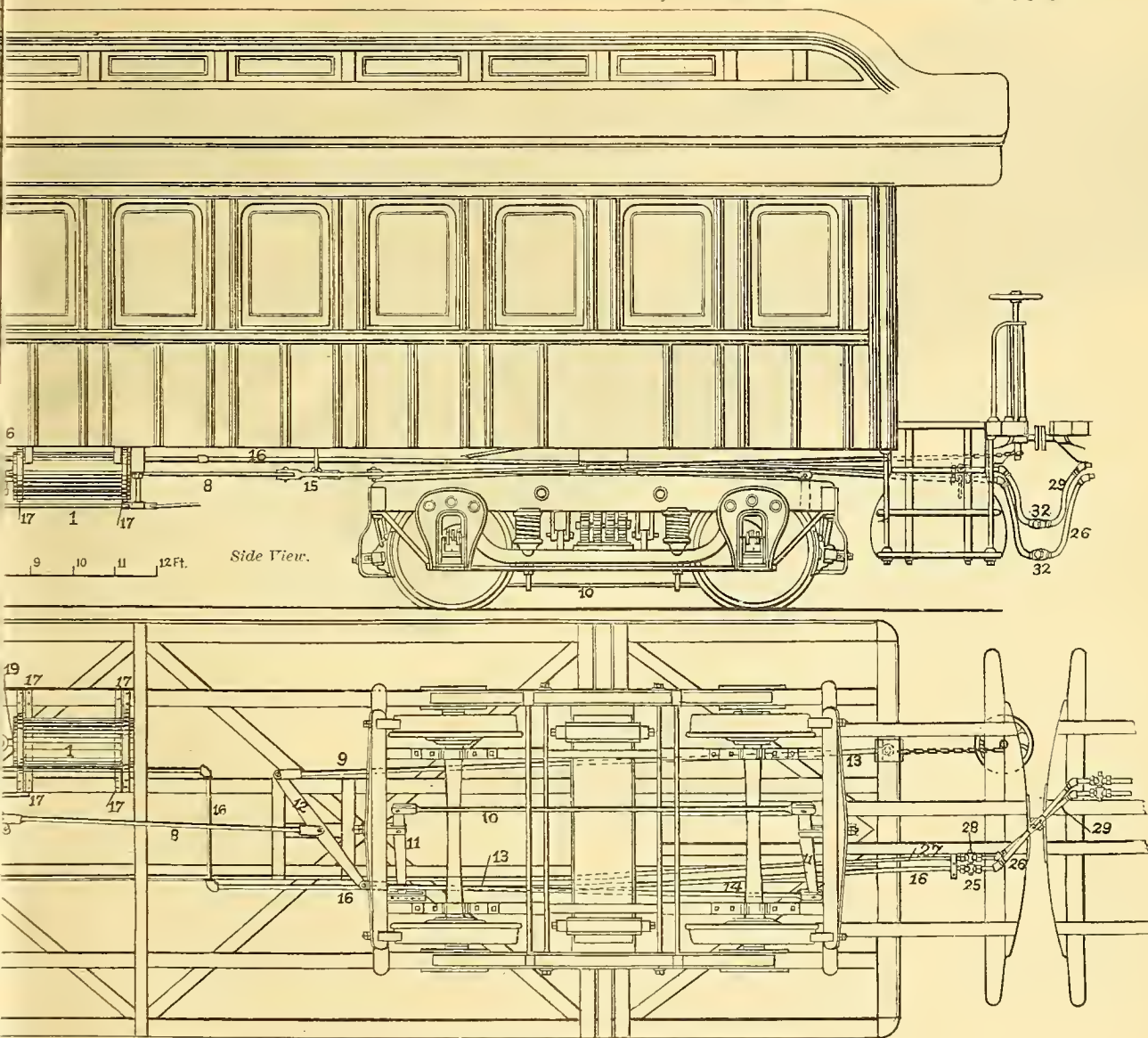
(See note to Fig. 322).







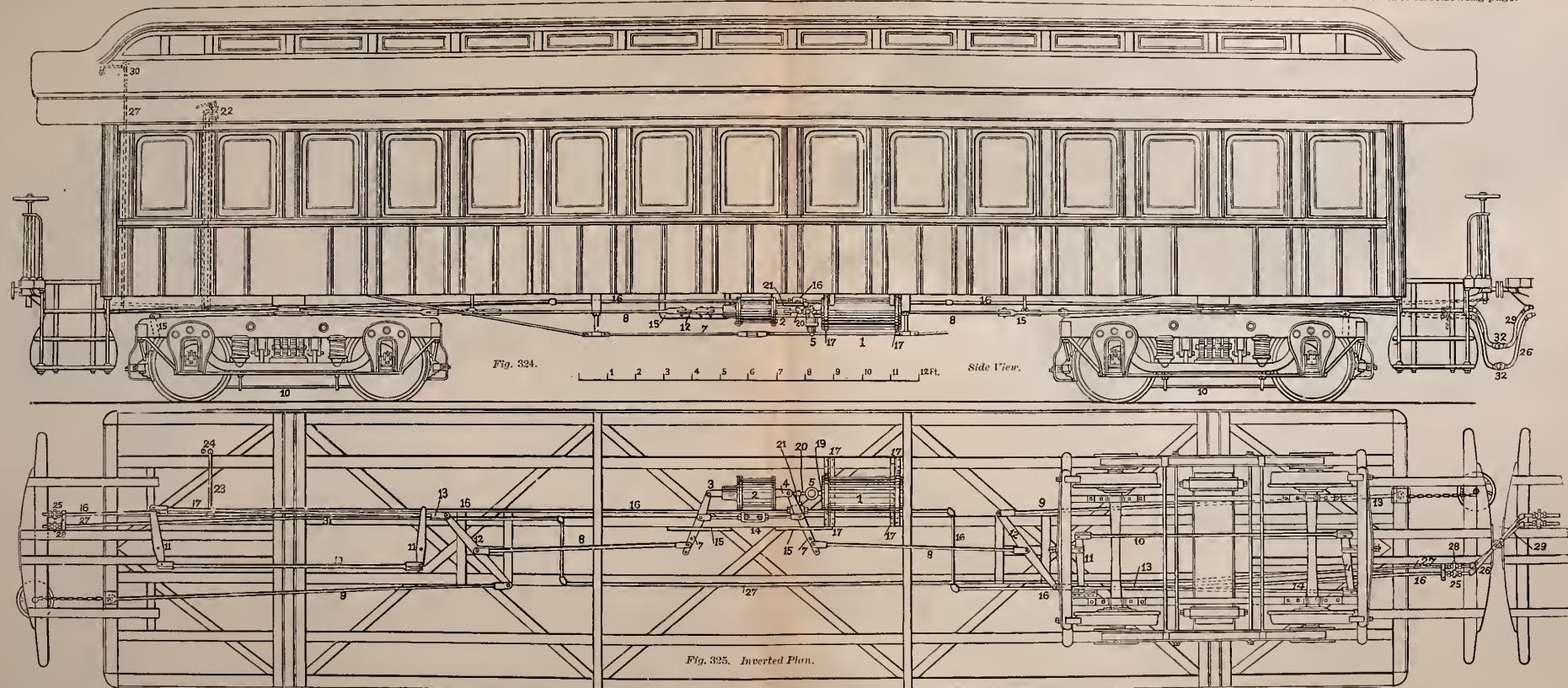
Numbers refer to List of Names of Parts on following page.



(The Train Signaling Apparatus is shown more fully in Figs. 687-691.)







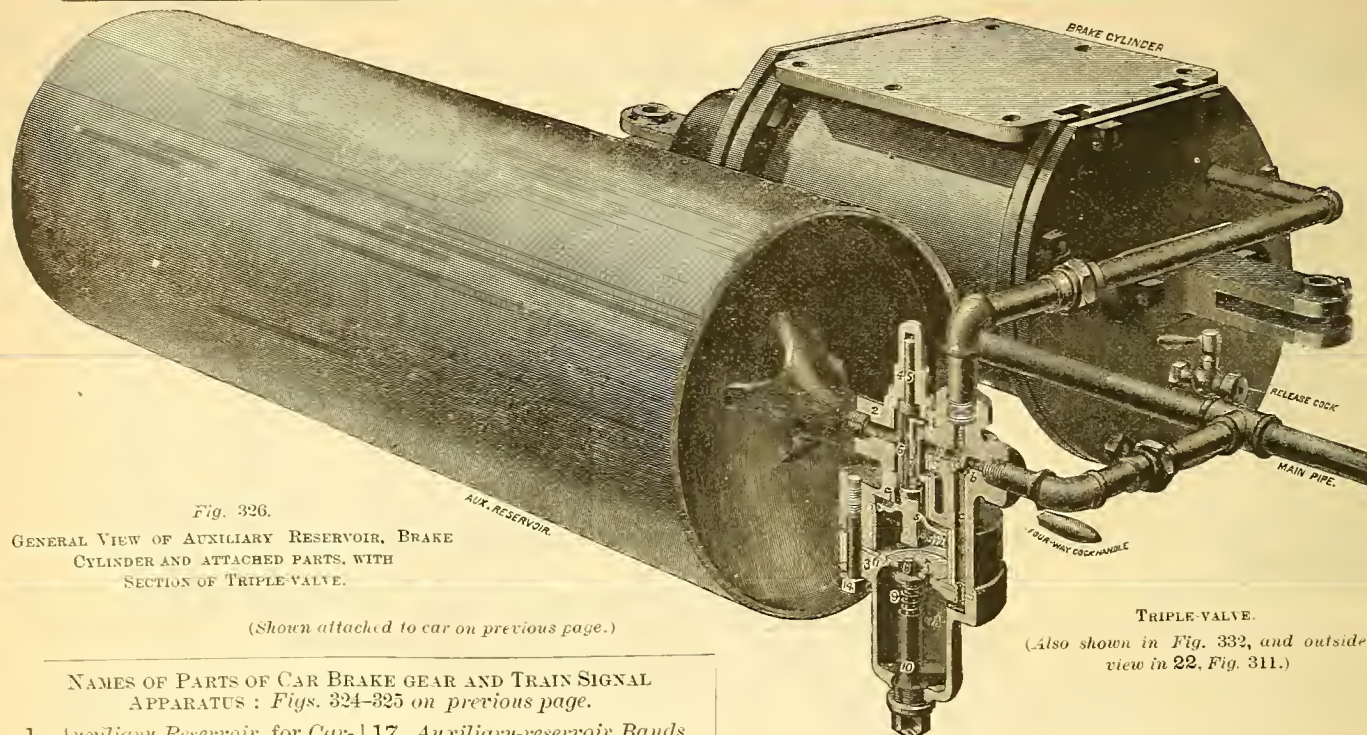


Fig. 326.

GENERAL VIEW OF AUXILIARY RESERVOIR, BRAKE CYLINDER AND ATTACHED PARTS, WITH SECTION OF TRIPLE-VALVE.

(Shown attached to car on previous page.)

NAMES OF PARTS OF CAR BRAKE GEAR AND TRAIN SIGNAL APPARATUS : Figs. 324-325 on previous page.

- |  |   |
|--|---|
| 1. Auxiliary Reservoir, for Car-brake. | 17. Auxiliary-reservoir Bands.            |
| 2. Brake-cylinder, for Car-brake.      | 18. Cylinder Release-cock.                |
| 3. Cross-head.                         | 19. Auxiliary-reservoir Nipple.           |
| 4. Cylinder-lever Bracket.             | 20. Triple-valve Branch-pipe.             |
| 5. Triple-valve.                       | 21. Brake-cylinder Pipe.                  |
| 6. Drain-cup.                          | 22. Conductor's Valve.                    |
| 7. Cylinder-levers.                    | 23. Conductor's-valve Pipe.               |
| 8. Floating Connecting-rod.            | 24. Conductor's-valve Discharge-pipe.     |
| 9. Brake-shaft Connecting-rod.         | 25. Stop-cock, for Brake pipe.            |
| 10. Lower Brake-rod                    | 26. Brake-hose and Coupling.              |
| 11. Brake Lever.                       | 27. Signal-pipe.                          |
| 12. Floating Lever.                    | 28. Signal-pipe Stop cock.                |
| 13. Secondary Brake-rod.               | 29. Signal-hose.                          |
| 14. Cylinder-lever Tie-rod.            | 30. Signal-valve.                         |
| 15. Cylinder-lever Support.            | 32. Brake-hose (or Signal-hose) Coupling. |
| 16. Brake Pipe.                        |   |

TRIPLE-VALVE.

(Also shown in Fig. 332, and outside view in 22, Fig. 311.)

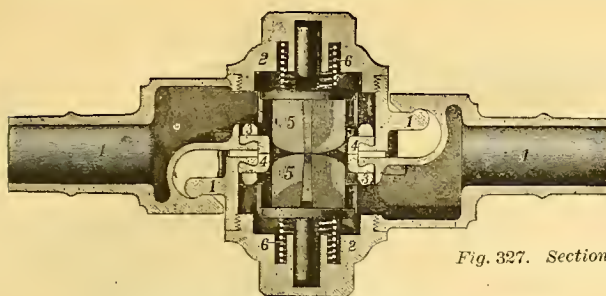
NAMES OF PARTS OF TRIPLE-VALVE : Fig. 326.

- |                         |                          |
|-------------------------|--------------------------|
| A. Drain-cup.           | 7. Graduating-valve.     |
| B. Piston-chamber.      | 8. Graduating-stem.      |
| C. Slide-valve Chamber. | 9. Graduating-spring.    |
| a to g. Air-passages.   | 10. Bottom-nut.          |
| 2. Triple-valve Case.   | 11. Rubber Packing-ring. |
| 3. Lower Cap.           | 12. Piston Packing-ring. |
| 4. Upper Cap.           | 13. Four-way Cock-plug.  |
| 5. Piston.              | 14. Connecting-bolt.     |
| 6. Slide-valve.         |                          |

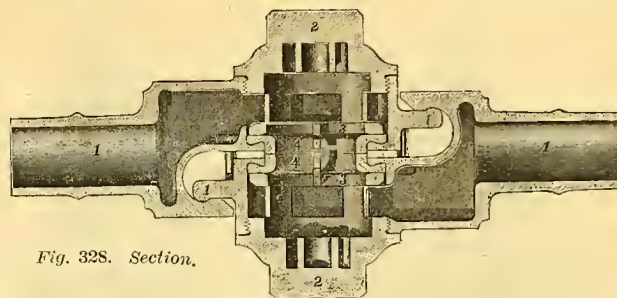
(See note to Fig. 322.)

(The reference numbers and letters are the same as used in the makers' lists.)





BRAKE-HOSE COUPLING, WITH VALVES  
(for "Straight-air" system, non-automatic).



BRAKE-HOSE COUPLING, WITHOUT VALVES  
(for automatic system).

NAMES OF PARTS; Figs. 327-328.

- |                   |                                  |                           |
|-------------------|----------------------------------|---------------------------|
| 1. Coupling-case. | 3. Coupling Packing-ring Washer. | 5. Coupling-valve.        |
| 2. Coupling-cap.  | 4. Coupling Packing-ring.        | 6. Coupling-valve Spring. |

(Couplings for Train Signaling Apparatus, Figs. 687-691, are similar, but made with thicker lips, so as not to intercouple with brake-hose.)

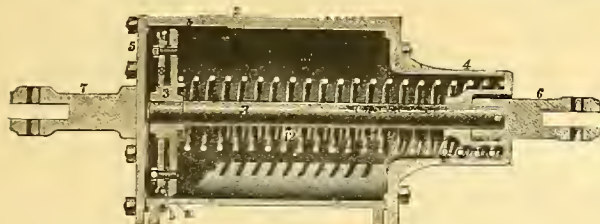


Fig. 329. Section.  
STANDARD 10-INCH CYLINDER (for standard-gauge passenger cars).

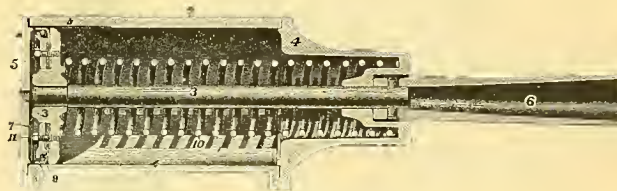


Fig. 330. Section  
TENDER CYLINDER.

NAMES OF PARTS OF CAR-CYLINDERS; Figs. 329 and 331.

2. Cylinder-body.
3. Piston and Piston-rod.
4. Back Cylinder-head.
5. Front Cylinder-head.
6. Cross-head.
7. Cylinder Lever-bracket.

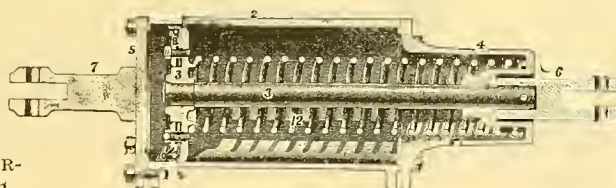


Fig. 331. Section.  
EIGHT-IN. CYLINDER (for narrow-gauge passenger-cars).

- |                                      |                           |
|--------------------------------------|---------------------------|
| 8. Piston Follower-plate.            | 11. Piston Follower-bolt. |
| 9. Piston Packing leather.           | 12. Release-spring.       |
| 10. Piston Packing-leather Expander. | (See note to Fig. 322.)   |

(For external views of these parts, see Figs. 303-7-9.)

(The reference numbers are the same as used in the makers' lists.)

NAMES OF PARTS OF TENDER-CYLINDER; Fig. 330.

2. Cylinder-body.
  3. Piston and Piston-rod.
  4. Back Cylinder-head.
  5. Front Cylinder-head.
  6. Piston-sleeve.
  7. Piston Follower-plate.
  8. Piston Packing-leather.
  9. Piston Packing-leather Expander.
  10. Release-spring.
  11. Piston Follower-bolt.
- (See note to Fig. 322.)

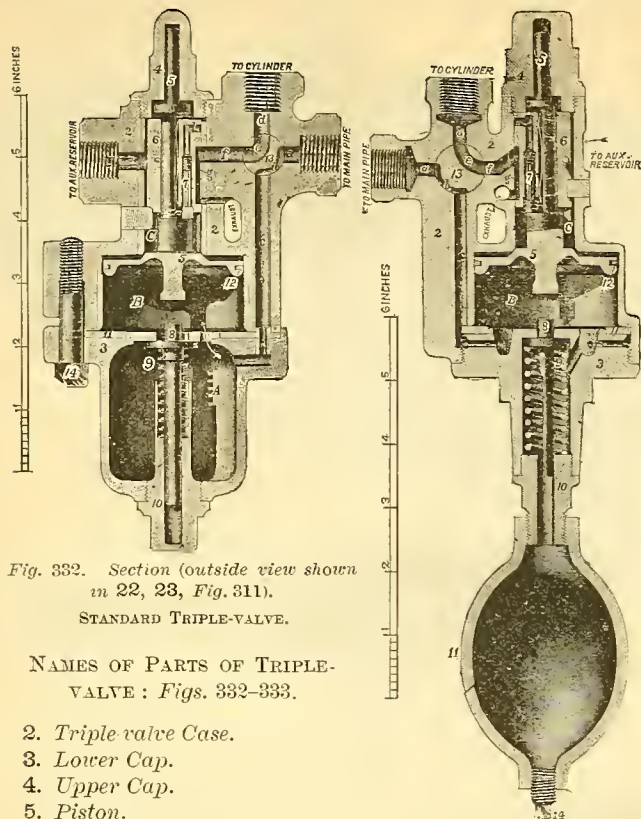


Fig. 332. Section (outside view shown in 22, 23, Fig. 311).

STANDARD TRIPLE-VALVE.

NAMES OF PARTS OF TRIPLE-VALVE : Figs. 332-333.

2. Triple valve Case.
  3. Lower Cap.
  4. Upper Cap.
  5. Piston.
  6. Slide-valve.
  7. Graduating-valve.
  8. Graduating-stem.
  9. Graduating-spring.
  10. Bottom Nut.
  11. Rubber Packing-ring.
- (And in Fig. 333, Drain cup also.)
12. Piston Packing-ring.
  13. Four-way Cock Plug.
  14. (Fig. 332). Connecting-bolt.
  14. (Fig. 333). Drain-cup Plug.
- (See note to Fig. 322 )

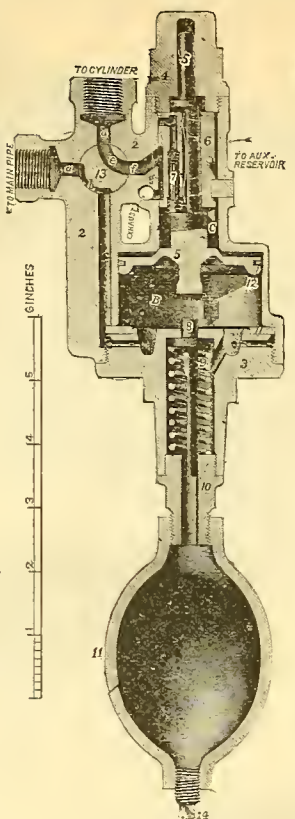


Fig. 333.

TRIPLE-VALVE, with BRASS CASE.  
(Old style, but still in local use ;  
Fig. 332 is the latest and most  
approved design )

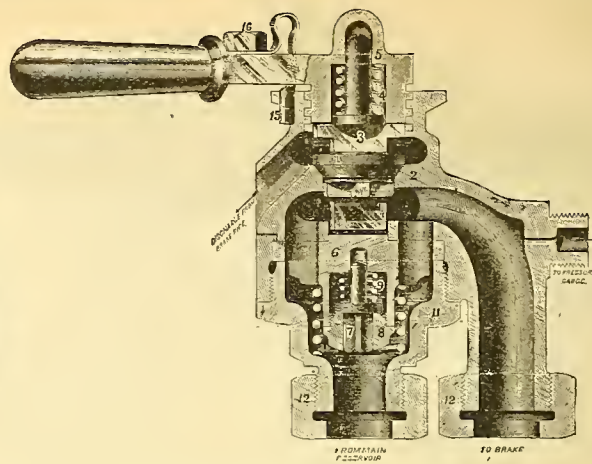


Fig. 334.

ENGINEER'S BRAKE-VALVE.

(External view shown in Fig. 311.)

(Now used instead of the old three-way cock, Figs. 318-319.)

NAMES OF PARTS ; Fig. 334.

- |                        |                                 |
|------------------------|---------------------------------|
| 1. Brake-valve Handle. | 10. Main-valve Spring.          |
| 2. Brake-valve Body.   | 11. Lower Cap.                  |
| 3. Top Valve.          | 12. Union.                      |
| 4. Top-valve Spring.   | 13. Stud-nut (not shown).       |
| 5. Washer.             | 14. Gauge-pipe Nut (not shown). |
| 6. Main Valve.         | 15. Handle Spring.              |
| 7. Feed-valve.         | 16. Handle-spring Nut.          |
| 8. Feed-valve Seat.    |                                 |
| 9. Feed-valve Spring.  |                                 |

(See note to Fig. 322.)

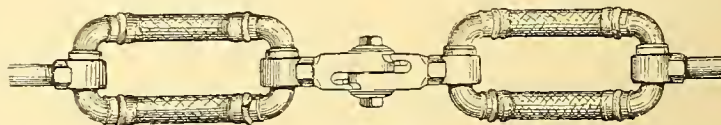


Fig. 335.

WESTINGHOUSE DUPLICATE-HOSE COUPLING.

(The reference numbers are the same as used in the makers' lists.)

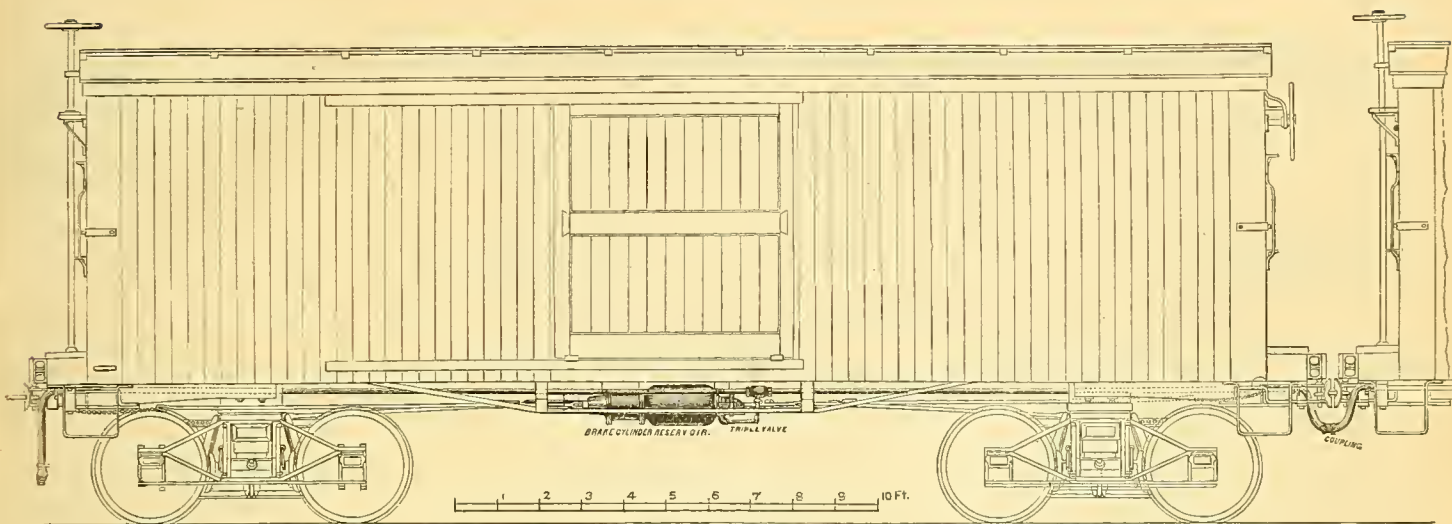


Fig. 336. Side Elevation.

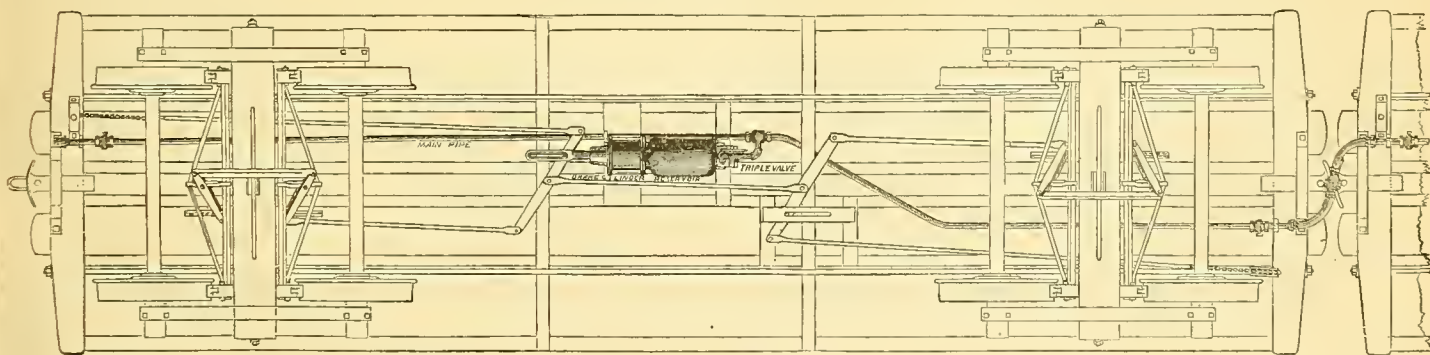


Fig. 337. Inverted Plan.

## WESTINGHOUSE AUTOMATIC FREIGHT-BRAKE.

Brake-cylinder, shown in detail in Fig. 352.

Hose-coupling, " " " " Figs. 327-328.

Triple-valve, " " " " Figs. 352-353.

(A different arrangement of brake-gear, with names of parts, is shown on following page.)



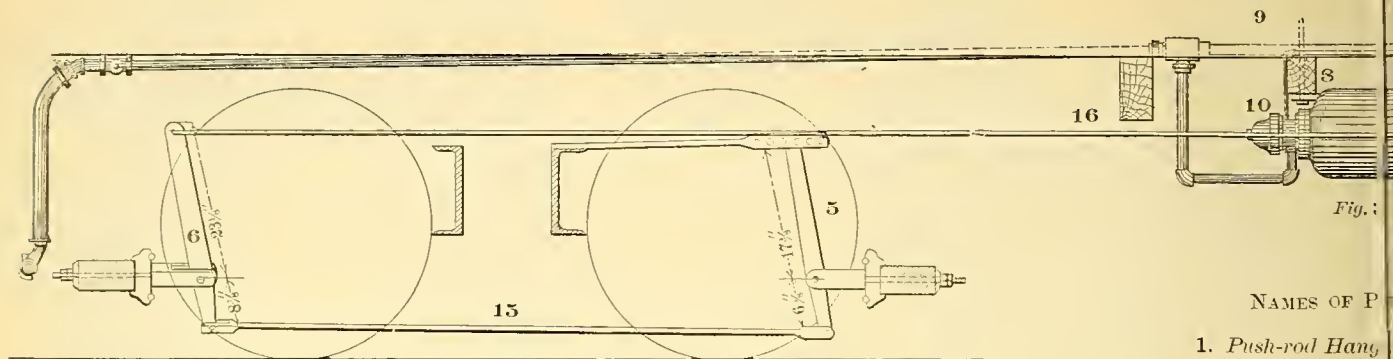


Fig. 338

NAMES OF PARTS

1. Push-rod Hang
2. Dead-lever Gui
3. Push-rod.
4. Floating Lever.
5. Dead Lever } B
6. Live Lever } B
7. Brake-cylinder
8. Brake-cylinder
9. Brake-pipe.
10. Triple Valve.
11. Reservoir.
12. Brake Cylinder
13. Brake-cylinder
14. Brake-shaft Co
15. Lower Brake-ro
16. Floating-lever C
17. Brake-beam.

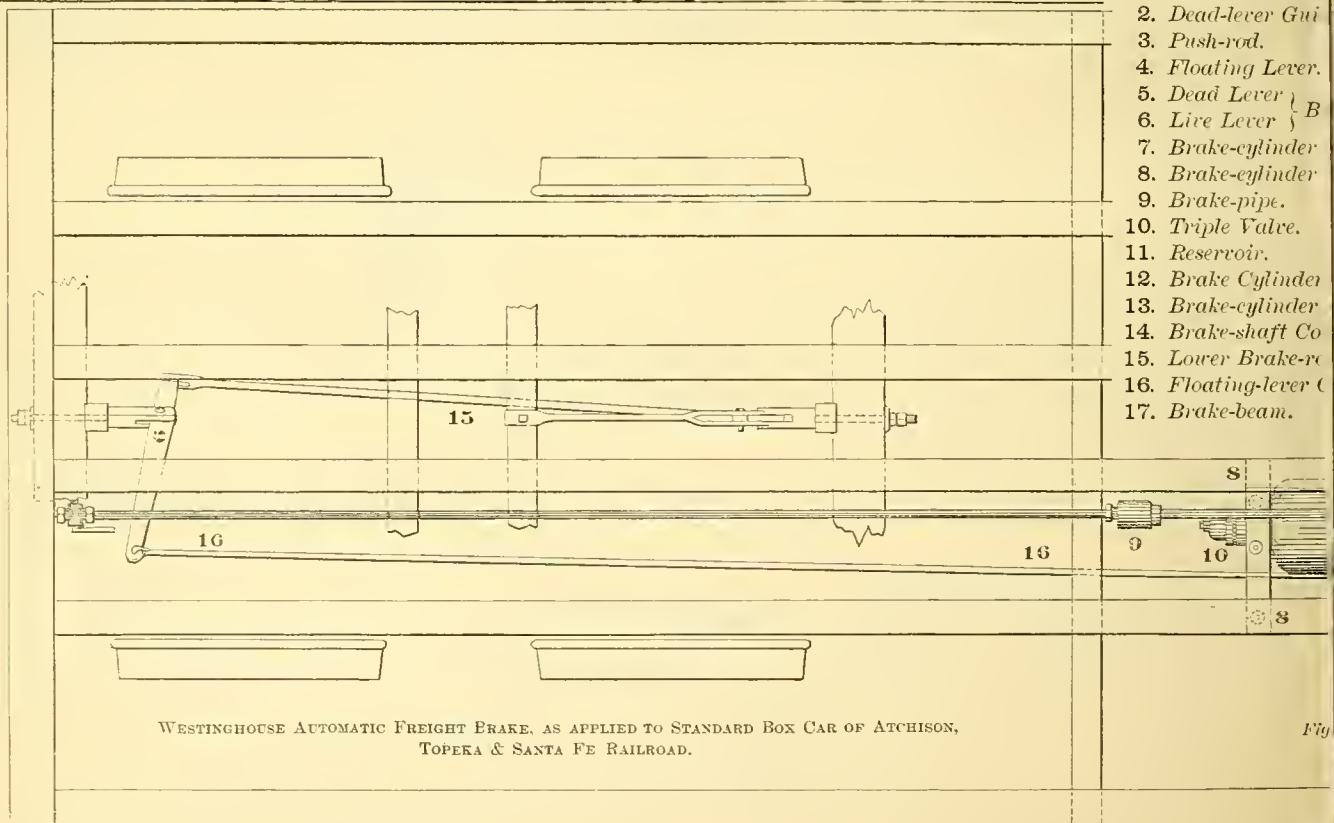


Fig. 339

WESTINGHOUSE AUTOMATIC FREIGHT BRAKE, AS APPLIED TO STANDARD BOX CAR OF ATCHISON,  
TOPEKA & SANTA FE RAILROAD.







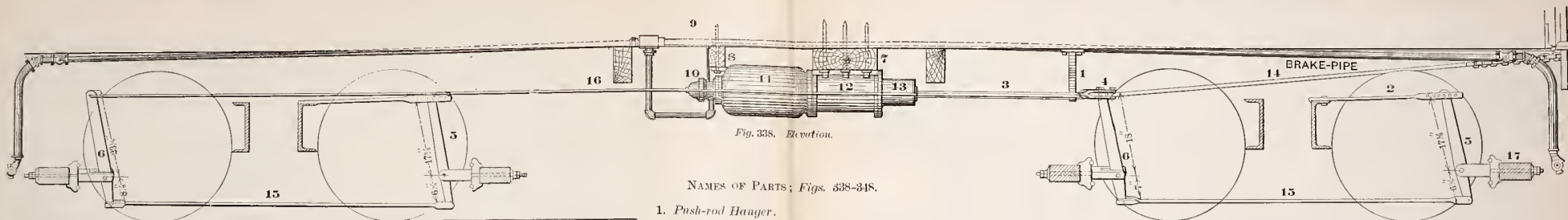
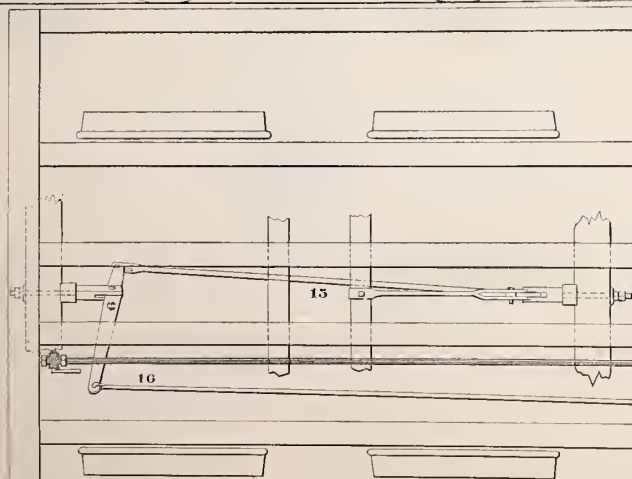


Fig. 338. Elevation.

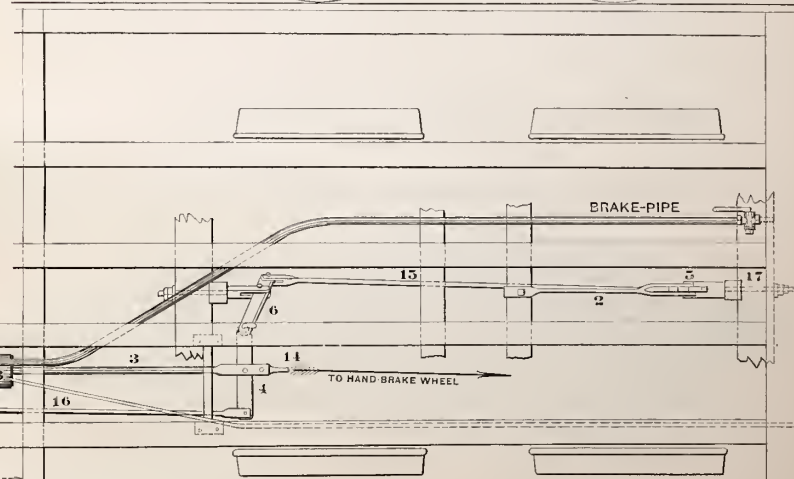
NAMES OF PARTS; Figs. 338-348.

1. Push-rod Hanger.
2. Dead-lever Guide, or Brake-lever Guide.
3. Push-rod.
4. Floating Lever.
5. Dead Lever } Brake Levers.
6. Live Lever }
7. Brake-cylinder Block.
8. Brake-cylinder End-block.
9. Brake-pipe.
10. Triple Valve.
11. Reservoir.
12. Brake Cylinder.
13. Brake-cylinder Head.
14. Brake-shaft Connecting-rod.
15. Lower Brake-rod.
16. Floating-lever Connecting-rod.
17. Brake-beam.



WESTINGHOUSE AUTOMATIC FREIGHT BRAKE, AS APPLIED TO STANDARD BOX CAR OF ATCHISON,  
TOPEKA & SANTA FE RAILROAD.

Fig. 339. Plan.



(A different arrangement of Brake-gear is shown in preceding page.)

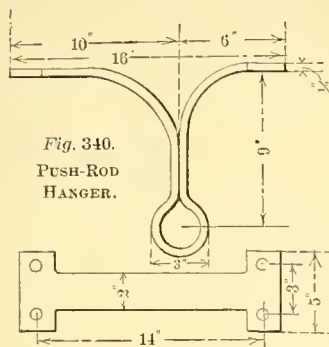


Fig. 340.  
PUSH-ROD  
HANGER.

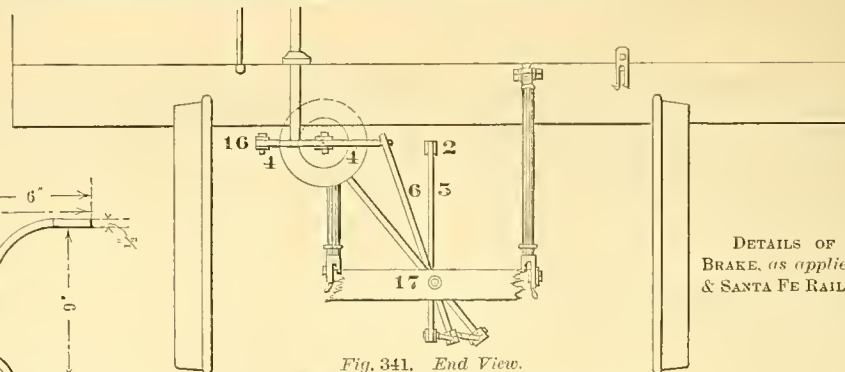


Fig. 341. End View.

(Numbers refer to previous page.)

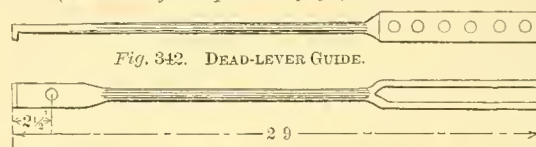


Fig. 342. DEAD-LEVER GUIDE.

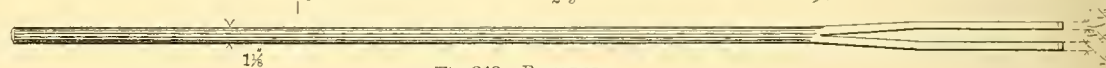


Fig. 343. PUSH-ROD.

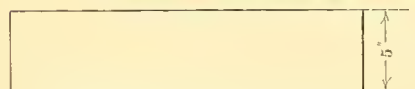


Fig. 344. BRAKE-CYLINDER BLOCK.

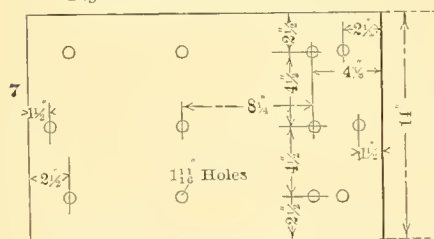


Fig. 345. BRAKE-CYLINDER END-BLOCK.

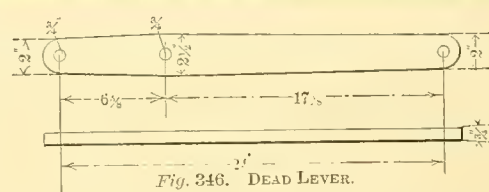


Fig. 346. DEAD LEVER.

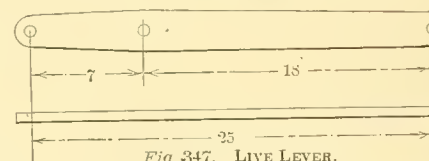


Fig. 347. LIVE LEVER.

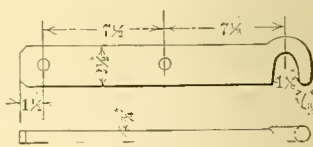


Fig. 349. FLOATING LEVER.

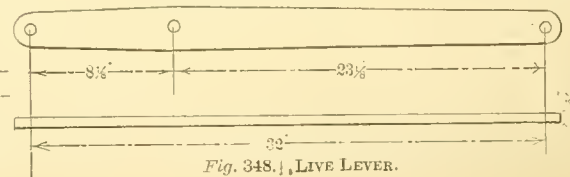


Fig. 348. LIVE LEVER.

DETAILS OF WESTINGHOUSE FREIGHT  
BRAKE, as applied on ATCHISON, TOPEKA  
& SANTA FE RAILROAD (see previous page).

## WESTINGHOUSE FREIGHT-BRAKE.

## NAMES OF PARTS OF COMBINED RESERVOIR AND CYLINDER; Fig. 352.

2. Cylinder-body.
3. Piston and Piston-rod.
4. Cylinder head.
5. Cross-head.
6. Piston-follower.
7. Piston Packing-leather.
8. Piston Packing-expander.
9. Release-spring.
10. Reservoir.
11. Triple valve.
- a. Triple-valve Air-pipe.
- b. Leakage-groove.

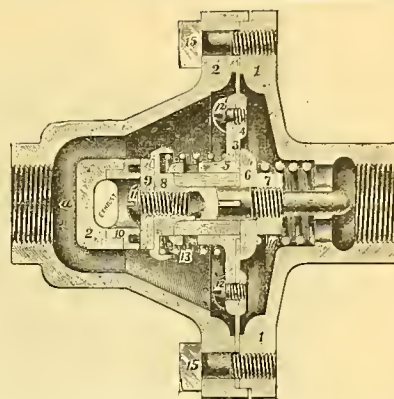


Fig. 351.

AUXILIARY DISCHARGE-VALVE. (Outside view; 56, Fig. 311.)  
(For Freight-brake: designed to be used with extra long trains, but not yet in use and intended only for exceptional use.)

## NAMES OF PARTS; Fig. 351.

- |                           |                             |
|---------------------------|-----------------------------|
| 1. Front Cap.             | 9. Discharge-valve Face.    |
| 2. Valve-body.            | 10. Discharge-valve Seat.   |
| 3. Diaphragm.             | 11. Discharge-valve Screw.  |
| 4. Front Diaphragm-plate. | 12. Diaphragm-screw.        |
| 5. Back Diaphragm-plate.  | 13. Discharge-valve Spring. |
| 6. Diaphragm Seat.        | 14. Diaphragm-spring.       |
| 7. Diaphragm-seat Nut.    | 15. Cap-screw.              |
| 8. Discharge-valve.       |                             |

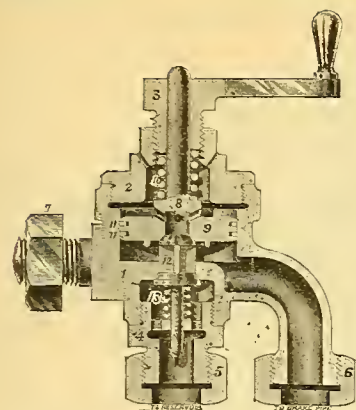


Fig. 350.

AUXILIARY BRAKE-VALVE. (Little used.) (Outside view; 33, Fig. 311.)  
(For use with Automatic Brake on extra heavy gradients, in either passenger or freight service.)

AUXILIARY BRAKE-VALVE COMPLETE; No. 33, PLATE A5.

## NAMES OF PARTS; Fig. 350.

- |                          |                          |
|--------------------------|--------------------------|
| 1. Valve-case.           | 8. Spring Guide.         |
| 2. Upper Cap.            | 9. Piston.               |
| 3. Graduating Handle.    | 10. Upper Spring.        |
| 4. Bottom Cap.           | 11. Piston Packing-ring. |
| 5. Reservoir-pipe Union. | 12. Central Valve.       |
| 6. Brake-pipe Union.     | 13. Lower Spring.        |
| 7. Bracket-nut.          |                          |

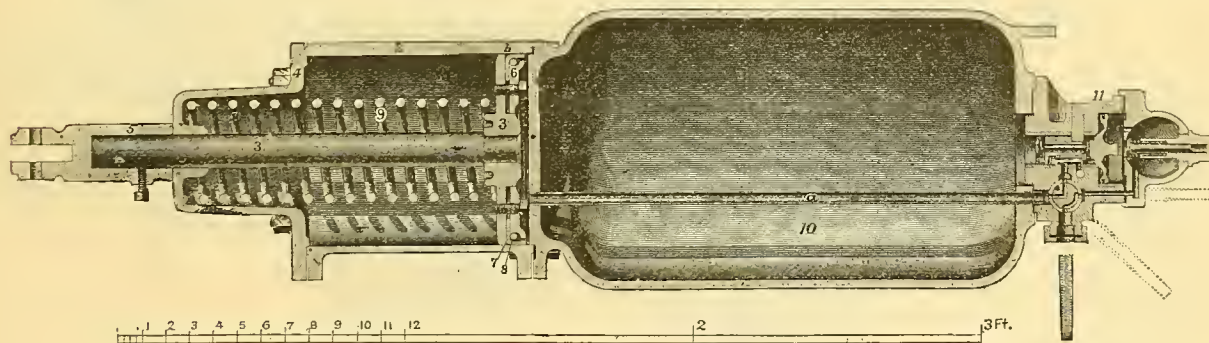


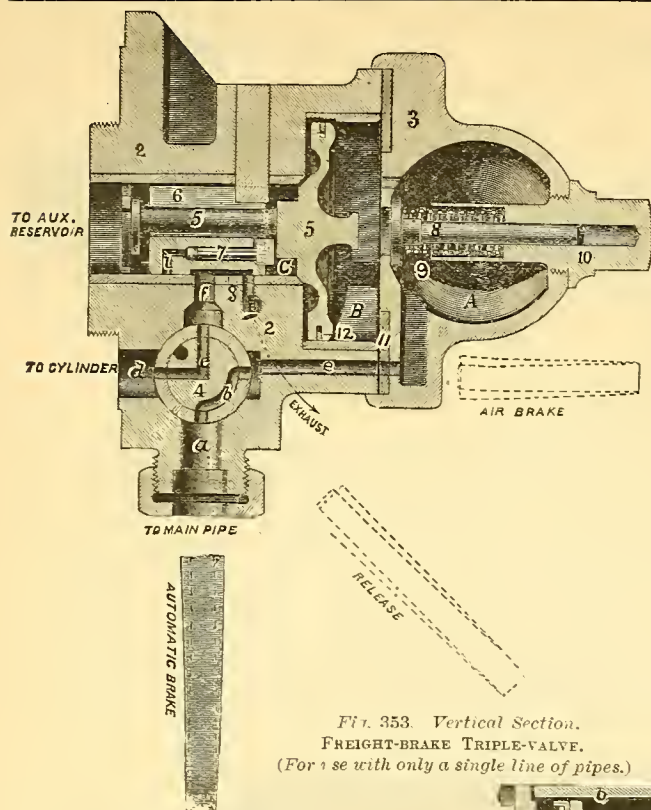
Fig. 352.

COMBINED TRIPLE-VALVE, RESERVOIR AND BRAKE CYLINDER FOR WESTINGHOUSE FREIGHT-BRAKE.

(Triple-valve shown in detail in Fig. 353.)

(The reference numbers are the same as used in the makers' lists.)





## WESTINGHOUSE FREIGHT BRAKE.

### NAMES OF PARTS ; Fig. 353.

- A. Air-chamber.
- B. Cylinder.
- C. Valve-chamber.
- a. to i. Air-passages.
- 2. Triple-valve Case.
- 3. Drain-cup.
- 4. Four-way Cock Plug.
- 5. Piston.
- 6. Slide-valve.
- 7. Graduating-valve.
- 8. Graduating-stem.
- 9. Graduating-spring.
- 10. Graduating-stem Nut.
- 11. Triple-valve Gasket.
- 12. Piston Packing-ring.

Fig. 353. Vertical Section.  
FREIGHT-BRAKE TRIPLE-VALVE.  
(For use with only a single line of pipes.)

### NAMES OF PARTS : Fig. 354.

- 2. Cylinder-body.
- 3. Piston and Piston-rod.
- 4. Back Cylinder-head.
- 5. Front Cylinder-head.
- 6. Cross-head.
- 7. Lever-bracket.
- 8. Piston-follower.
- 9. Piston Packing-leather.
- 10. Piston Packing-leather Expander.
- 11. Piston-follower Bolt.
- 12. Release Spring.

(See note to Fig. 322.)

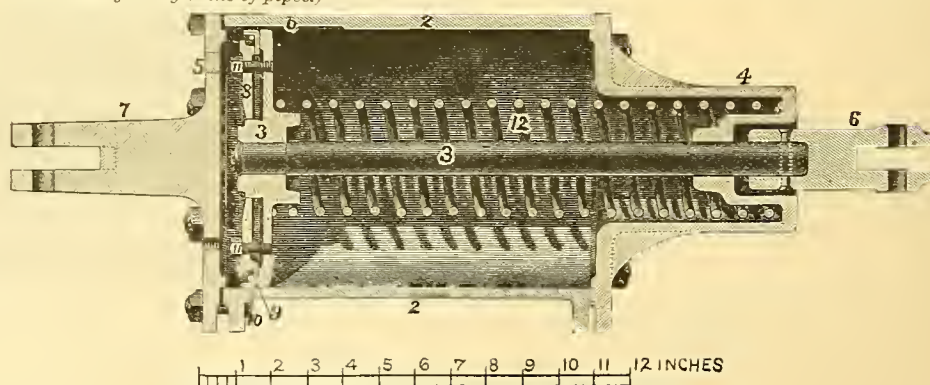


Fig. 354. Vertical Section.  
STANDARD FREIGHT-BRAKE CYLINDER.

(Used where the reservoir and triple-valve are arranged as shown in Fig. 355)  
(The reference numbers are the same as used in the makers' lists.)

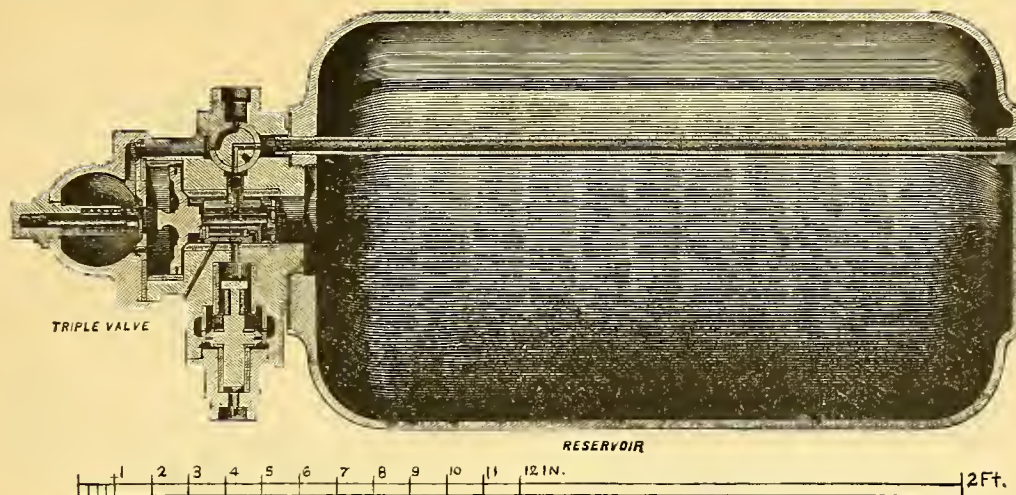


Fig. 355. RESERVOIR AND TRIPLE VALVE COMBINED (for freight service).  
(The Triple Valve here shown is the same as shown in Figs. 356-357 below, but Fig. 355 is considered the preferable form.)

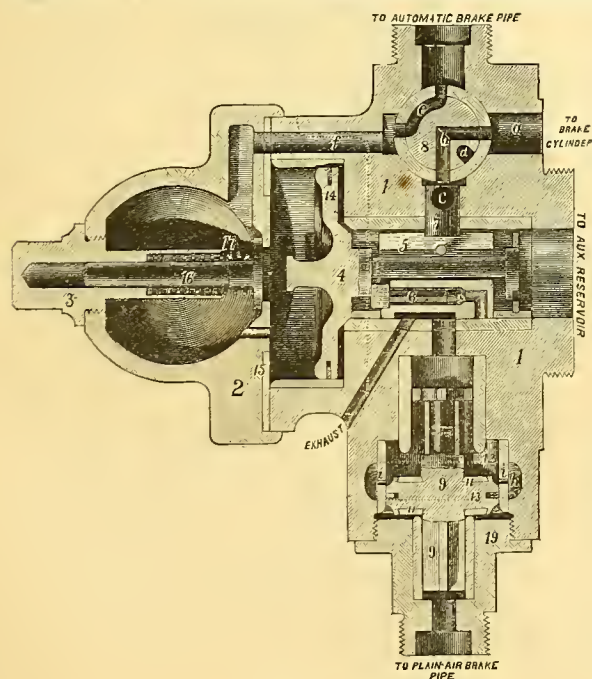


Fig. 356. Vertical Section.

TRIPLE VALVE with DOUBLE CHECK (little used).  
(For both passenger and freight service.)

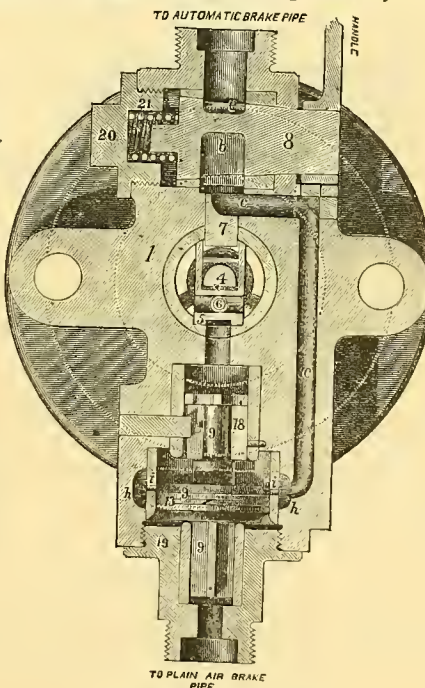


Fig. 357. Horizontal Section.

# NAMES OF PARTS; Figs. 355-357.

1. Triple-valve Case.
  2. Drain-cup.
  3. Drain-cup Nut.
  4. Piston.
  5. Slide-valve.
  6. Graduating-valve.
  7. Guide-pin.
  8. Four-way Cock Plug.
  9. Double-check Valve.
  10. Upper-valve Bushing.
  11. Double-check Valve-face.
  12. Lower-valve Bushing.
  13. Double-check Valve Packing-ring.
  14. Piston Packing-ring.
  15. Triple-valve Gasket.
  16. Graduating-stem.
  17. Graduating-spring.
  18. Auxiliary Release-valve.
  19. Double-check Valve Cap.
  20. Four-way Cock Cap.
  21. Four-way Cock Spring.
- (See note to Fig. 322.)

(The reference numbers are the same as used in the makers' lists.)



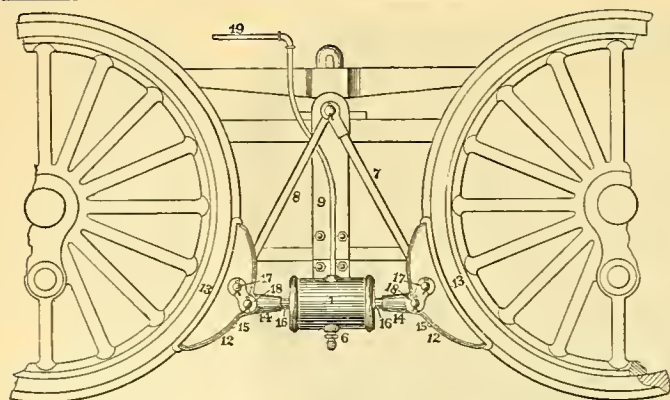


Fig. 358. Side Elevation.  
HORIZONTAL-CYLINDER STEAM-DRIVER BRAKE.

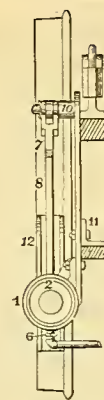


Fig. 358 1/2. Transverse Elevation.

American Brake Co.'s Steam Brake-gear; Figs. 358-369.

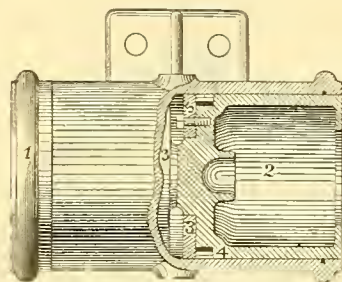


Fig. 359. Section of Brake Cylinder.

NAMES OF PARTS OF HORIZONTAL-CYLINDER DRIVER BRAKE; Figs. 358-359.

- |                          |                      |
|--------------------------|----------------------|
| 1. Cylinder.             | 11. Angle-iron.      |
| 2. Piston.               | 12. Brake-block.     |
| 3. Piston-follower.      | 13. Brake-shoe.      |
| 4. Packing-rings.        | 14. Push-bar Cap.    |
| 5. Follower-bolt.        | 15. Adjusting-screw. |
| 6. Automatic Drip-valve. | 16. Push Bar.        |
| 7. Forked Hanger.        | 17. Hanger-pin.      |
| 8. Plain Hanger.         | 18. Push-bar Pin.    |
| 9. Face-plate.           | 19. Supply-pipe.     |
| 10. Hanger-stud.         |                      |

(All to be specified as for Horizontal-cylinder Driver Brake.)

(The reference numbers are the same as used in the makers' lists.)

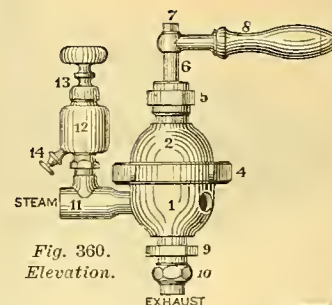


Fig. 360.  
Elevation.

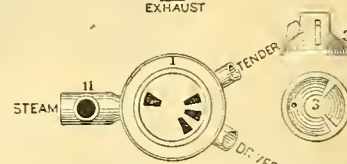


Fig. 361. Lower Valve-shell.

Fig. 362.  
Brake-valve.

Figs. 360-362. STEAM BRAKE-VALVE AND OILER

NAMES OF PARTS; Figs. 360-362.

1. Lower Valve-shell.
2. Upper Valve-shell.
3. Brake-valve.
4. Spanner-nut.
5. Gland-nut.
6. Valve-stem.
7. Valve-stem Nut.
8. Brake-valve Handle.
9. Bracket-nut.
10. Exhaust-union.
11. Oiler Tee.
12. Oil-cup.
13. Oil-cup Cap.
14. Oil-cup Drip.



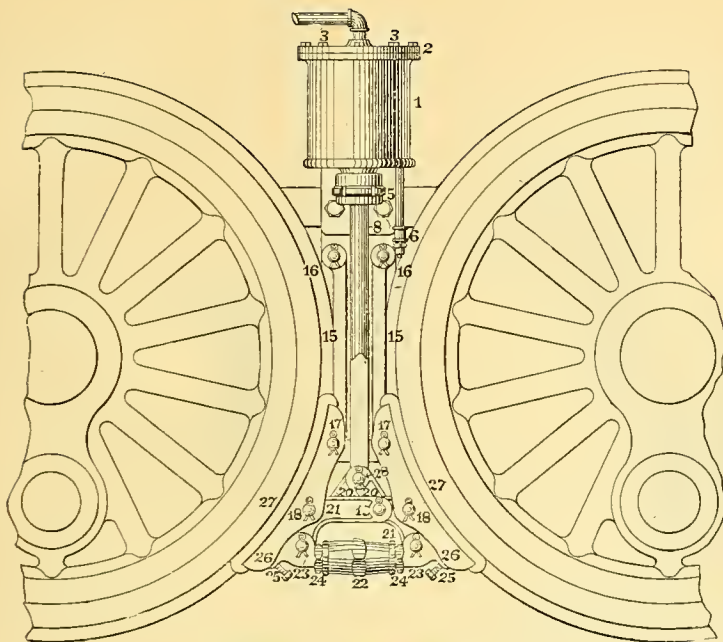


Fig. 363. Side Elevation.

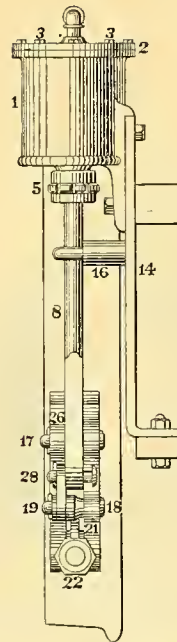


Fig. 364. Transverse Elevation.

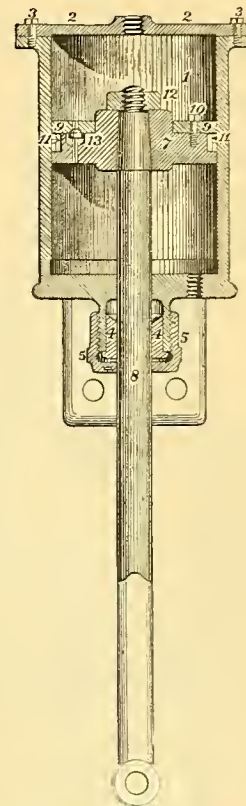


Fig. 365. Section of Brake Cylinder.

## BELL-CRANK STEAM DRIVER BRAKE.

## NAMES OF PARTS OF BELL-CRANK DRIVER BRAKE ; Figs. 363-365.

- |                           |                                      |                      |
|---------------------------|--------------------------------------|----------------------|
| 1. Cylinder.              | 11. Piston Packing-ring.             | 20. Link.            |
| 2. Cylinder-head.         | 12. Piston-rod Nut.                  | 21. Bell-crank.      |
| 3. Cylinder-head Bolt.    | 13. Automatic Drip Valve for Piston. | 22. Turnbuckle.      |
| 4. Piston-gland.          | 14. Face-plate.                      | 23. Push-bar.        |
| 5. Gland Spanner-nut.     | 15. Brake-shoe Hanger.               | 24. Lock Nut.        |
| 6. Automatic Drip-valve.  | 16. Hanger Stud.                     | 25. Adjusting-screw. |
| 7. Piston-head.           | 17. Hanger Pin.                      | 26. Brake-block.     |
| 8. Piston-rod.            | 18. Bell-crank Pin.                  | 27. Brake-shoe.      |
| 9. Piston-follower.       | 19. Link Pin.                        | 28. Piston-rod Pin.  |
| 10. Piston-follower Bolt. |                                      |                      |

(All to be specified as for Bell-crank Driver Brake.)

(Two other styles of driver brakes are manufactured by the same company, one with spiral springs interposed for transmitting the pressure to the brake-blocks and the other a single driver brake operated by a system of levers.)

(The reference numbers are the same as used in the makers' lists.)

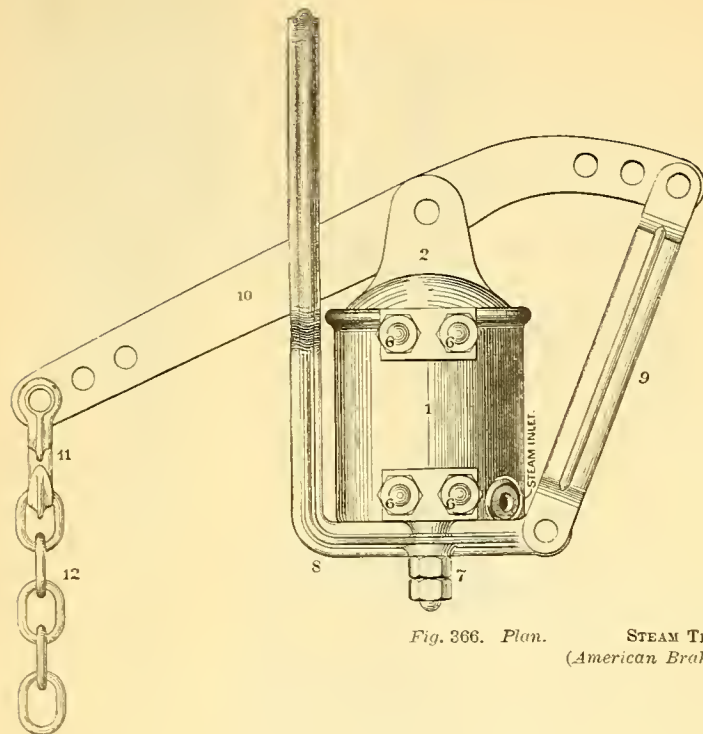


Fig. 366. Plan.

STEAM TENDER BRAKE.  
(American Brake Co.'s Brake-gear.)

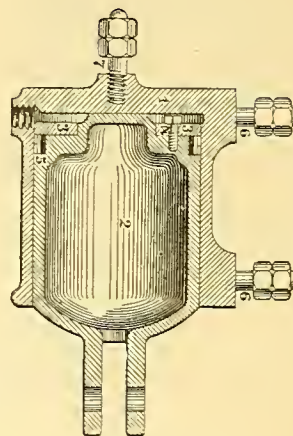


Fig. 367. Section.

NAMES OF PARTS OF TENDER BRAKE: Figs. 366-367.

- |                            |                           |
|----------------------------|---------------------------|
| 1. Cylinder.               | 7. Yoke Stud and Nuts.    |
| 2. Piston.                 | 8. Yoke,                  |
| 3. Piston-follower.        | 9. Link.                  |
| 4. Piston-follower Bolt.   | 10. Cylinder Brake-lever. |
| 5. Piston Packing-rings.   | 11. Clevis-hook.          |
| 6. Bracket Studs and Nuts. | 12. Brake-chain.          |

(All to be specified as for Tender Brake.)

(The reference numbers are the same as used in the makers' lists.)

## NAMES OF PARTS OF

BRAKE-GEAR; *Figs.*  
368-369.

1. Axle-clamp.
2. Governor-blocks.
3. Governor-block Springs.
4. Governor-spring Thimble.
5. Disk.
6. Fork.
7. Fork-bracket.
8. Lower Bell-crank Rod.
9. Tail-nut.
10. Lock-nut.
11. Bell-cranks.
12. Lower Bell-crank Bracket.
13. Upper Bell-crank Bracket.
14. Upper Bell-crank Rod.
15. Push-bar.
16. Pendant-lever.
17. Locking-pawl.
18. Release-chain.
19. Release-chain Eye-bolt.

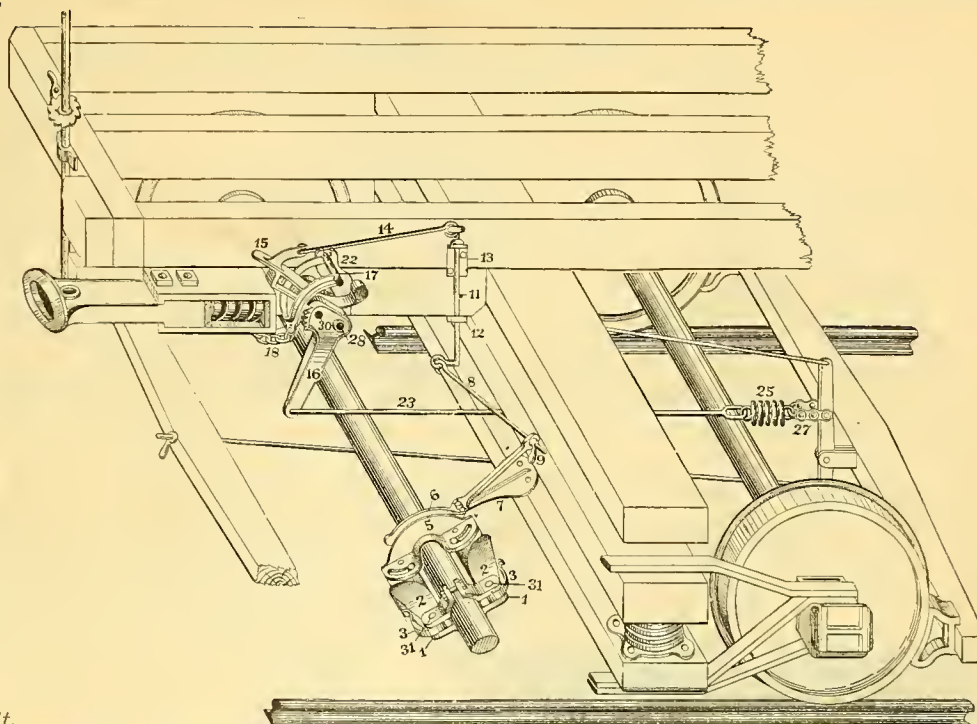


Fig. 368. Perspective View.

AUTOMATIC FREIGHT-CAR COMPRESSION BRAKE.  
(American Brake Co.)

(Designed to be operated preferably, but not necessarily, in connection with the locomotive and tender brake, *Figs.* 358-367.)

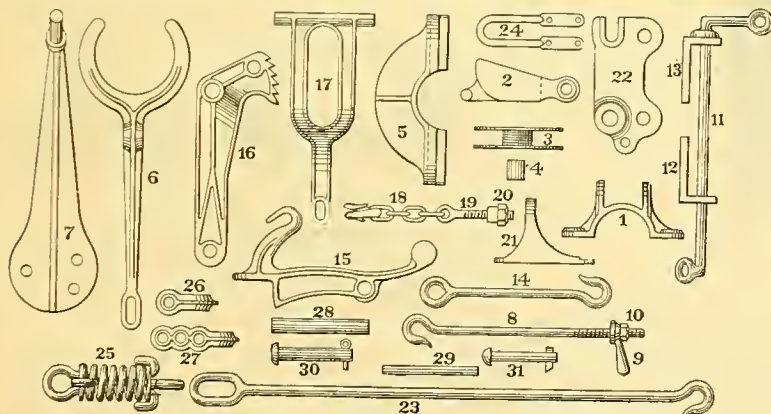


Fig. 369. Separate Views of Details in Fig. 368.

(The reference numbers are the same as used in the makers' lists.)

- |                                   |                                 |
|-----------------------------------|---------------------------------|
| 20. Release Nut.                  | 27. Three-hole Clevis.          |
| 21. Release Bracket.              | 28. Pendant-lever Fulcrum-pin.  |
| 22. Check-plates.                 | 29. Stop-pin.                   |
| 23. Lower Connecting-rod.         | 30. Push-bar Pin and Cotter.    |
| 24. Lower Connecting-rod Stirrup. | 31. Governor-block Pin and Key. |
| 25. Relief-spring.                |                                 |
| 26. Single-hole Clevis.           |                                 |



## DOORS.

NAMES OF PARTS OF DOORS; Fig. 370.

- |                                |                       |
|--------------------------------|-----------------------|
| 1. Door-post or Jamb.          | 12. Upper Door-sash.  |
| 2. Door-mullion.               | 13. Lower Door-sash.  |
| 3. Door Name-plate.            | 14. Door-sash Bolt.   |
| 4. Top Door-rail.              | 15. Door-sash Plate.  |
| 5. Bottom Door-rail.           | 16. Door-hinge.       |
| 6. Middle or Lock Door-rail.   | 17. Door-knob.        |
| 7. Parting Door-rail.          | 18. Door-lintel.      |
| 8. Door-stile.                 | 19. Door-lock.        |
| 10. Lower or Twin Door-panels. | 20. Door-lock Keeper. |
| 11. Middle Door-panel.         |                       |

(For names of parts surrounding doors, DOOR-SILL, DOOR-POST, DOOR-LINTEL, etc.,  
see CAR-BODIES; PASSENGER.)

(See also FURNISHINGS, DOOR, and FURNISHINGS, LOCKS, for further details.)

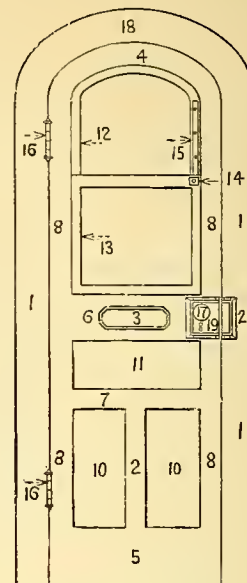


Fig. 370. Interior View.  
PASSENGER-CAR DOOR.

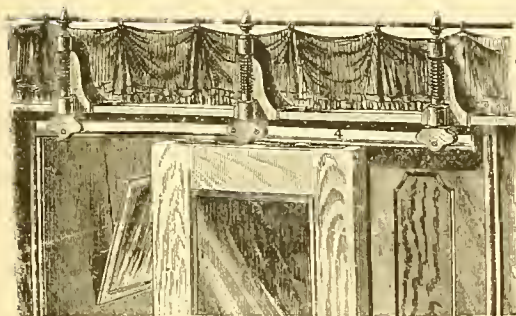


Fig. 371. Perspective View.  
SLIDING-DOOR FIXTURES FOR PARLOR AND SLEEPING CARS.  
(See also FURNISHINGS, DOOR FIXTURES.)

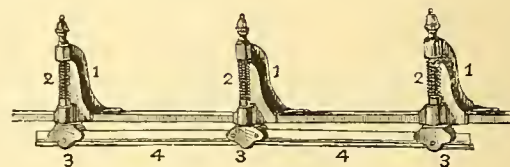


Fig. 372. Details of upper rail.

(Brackets upon the side of the partition are also used with these sliding doors, very similar in detail to the above, but horizontal instead of vertical.)

NAMES OF PARTS; Figs. 371-372.

- |                       |                       |
|-----------------------|-----------------------|
| 1. Door-rail Bracket. | 3. Door-rail Carrier. |
| 2. Door-rail Spring.  | 4. Top Door-rail.     |

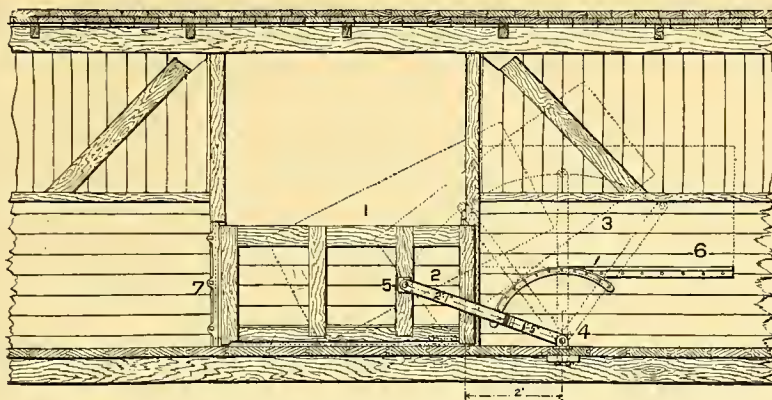


Fig. 373. Side Elevation; Inside View.

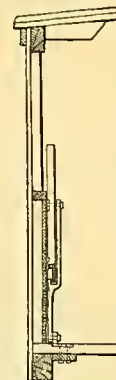


Fig. 374.

Cross Section at rear end of door.

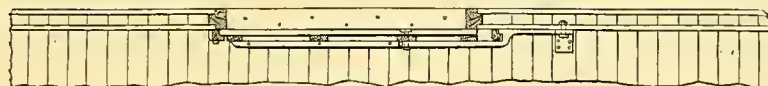


Fig. 375. Plan.

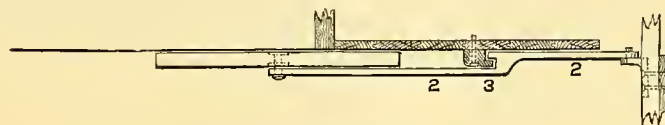


Fig. 376.

Section through Guide-bars.

SUSEMIEL &amp; MILLER GRAIN-DOOR.

## NAMES OF PARTS; Figs. 373-376.

- |                     |                       |
|---------------------|-----------------------|
| 1. Grain-door.      | 5. Guide-bar Plate.   |
| 2. Guide-bar.       | 6. Grain-door Rest.   |
| 3. Segment.         | 7. Grain-door Keeper. |
| 4. Guide-bar Pivot. |                       |



Fig. 377. Section.

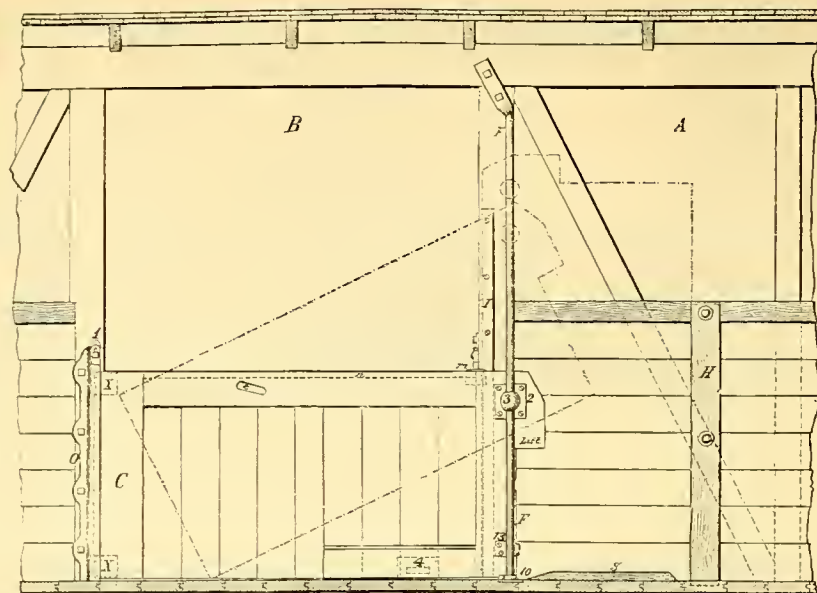


Fig. 378. Side Elevation, Interior View.



Fig. 380. Section.

Fig. 379. Plan.



VAN LIEUW'S GRAIN DOOR.

NAMES OF PARTS : Figs. 377-382.

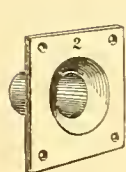


Fig. 381.  
Stanchion-socket.



Fig. 382.  
Stanchion  
and Guide-rod.

1. Lug.
2. Stanchion-socket.
3. Stanchion.
4. Lift.
5. Grain-door Latch.
6. Grain-door Lock.
10. Guide-rod Socket.
- B. Door.
- C. Grain-door Stile.
- e. Hand-hole.

- F. Stanchion Guide-rod.
- g. Grain-door Floor-stop.
- H. Grain-door Side-stop.
- I. Chafing-strip.
- O. Grain-door guide.
- m. Grain-door Lock, 6. and Latch, 5.
- n. Grain-door Rail.
- S. Door-sill.
- X. Grain-door Corner-plate.



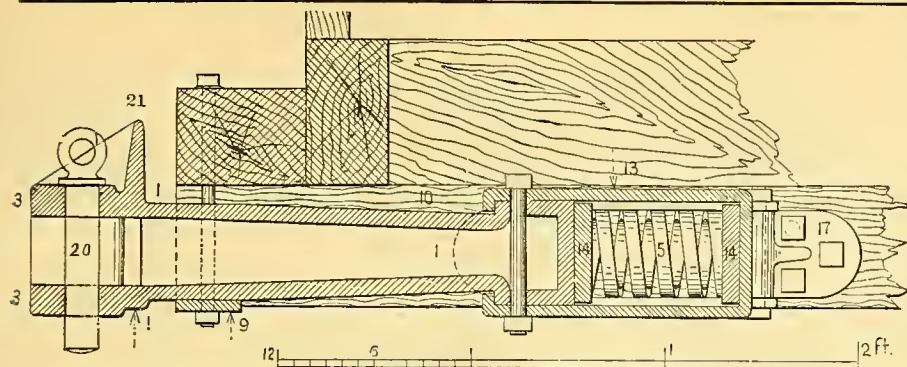


Fig. 383. Longitudinal Section.

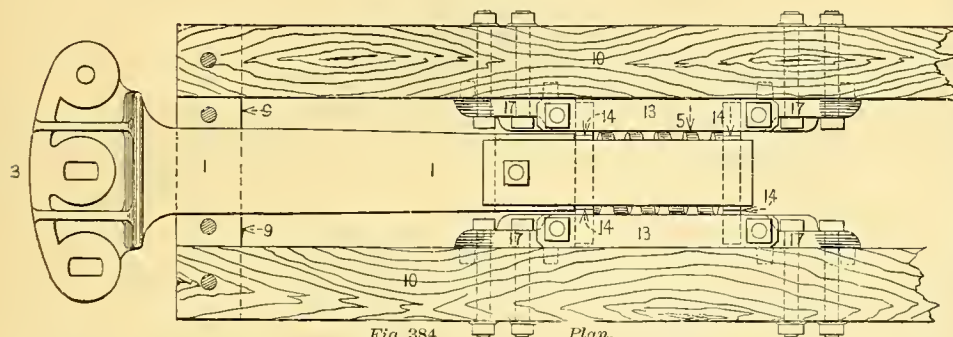


Fig. 384. Plan.

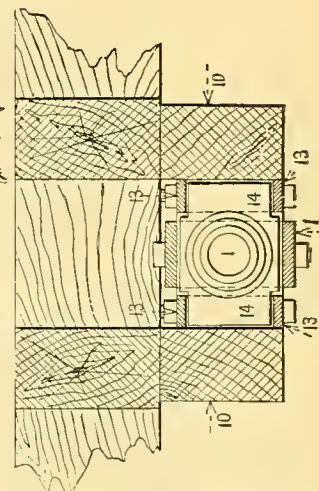


Fig. 386. Transverse Section.

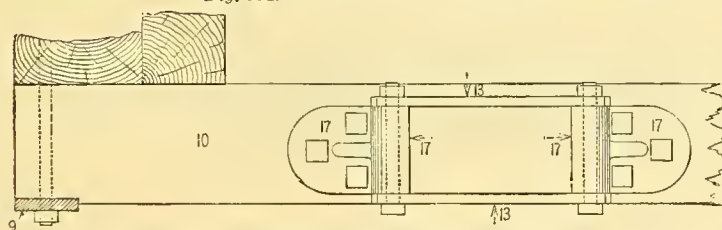


Fig. 385. Longitudinal Section, with Drawbar Removed.

FREIGHT-CAR DRAW-GEAR, WITH POTTER DRAWBAR, CHICAGO, BURLINGTON &amp; QUINCY RAILROAD.

## NAMES OF PARTS OF DRAW-GEAR; Figs. 383-386.

- |                             |                         |  |                         |
|-----------------------------|-------------------------|--|-------------------------|
| 1. Drawbar.                 | 7. Drawbar Bolt.        | 12. Draw-timber Tie-bar.               | 16. Drawbar Jaw.        |
| 2. Drawbar Face-plate.      | 8. Draw-spring Stop.    | 13. Drawbar Guides.                    | 17. Drawbar Stop.       |
| 3. Drawbar Head.            | 9. Drawbar Carry-iron.  | 14. Drawbar Follower-plates.           | 18. Draw-timber Pocket. |
| 4. Drawbar Distance-piece.  | 10. Draw-timbers.       | 15. Auxiliary Drawbar Follower-plates. | 19. Draw-rod.           |
| 5. Draw-spring.             | 11. Draw-timber Guards. |  | 20. Coupling-pin.       |
| 6. Auxiliary Buffer-spring. |                         |  | 21. Buffer Safety-lug.  |

(Parts in Roman type, not shown in this draw-gear.)

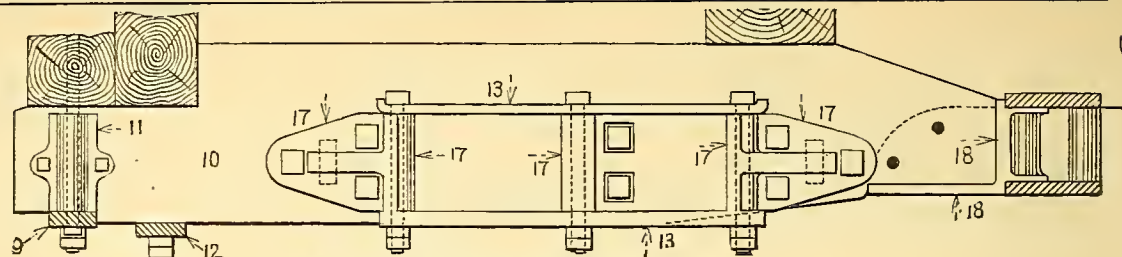


Fig. 387. Side View, with Drawbar Removed.

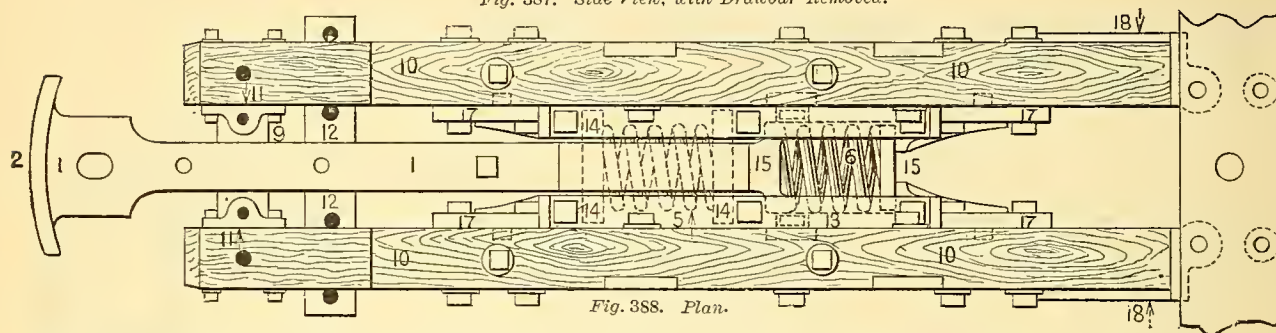


Fig. 388. Plan.

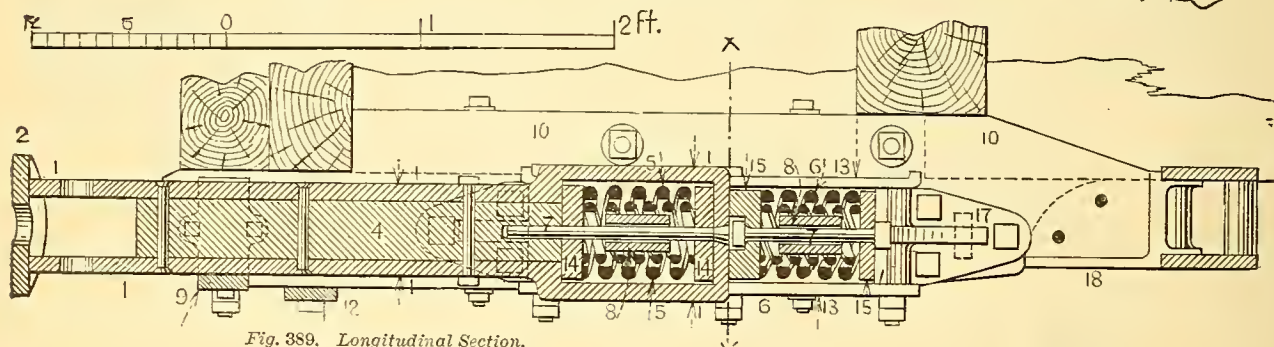


Fig. 389. Longitudinal Section.

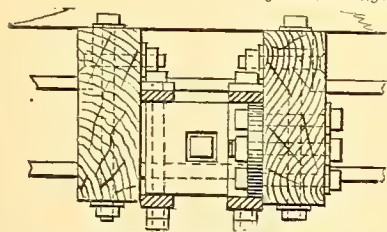


Fig. 390. Transverse Section through rear of Draw-timbers.

FREIGHT-CAR DRAW-GEAR (Old Standard), NEW YORK CENTRAL & HUDSON RIVER RAILROAD.

NAMES OF PARTS OF DRAW-GEAR; Figs. 387-390.

- |                             |                              |                         |
|-----------------------------|------------------------------|-------------------------|
| 1. Drawbar.                 | 8. Draw-spring Stop.         | 15. Auxiliary Drawbar   |
| 2. Drawbar Face-plate.      | 9. Drawbar Carry-iron.       | Follower-plates.        |
| 3. Drawbar Head.            | 10. Draw-timbers.            | 16. Drawbar Jaw.        |
| 4. Drawbar Distance-piece.  | 11. Draw-timber Guards.      | 17. Drawbar Stop.       |
| 5. Draw-spring.             | 12. Draw-timber Tie-bar.     | 18. Draw-timber Pocket. |
| 6. Auxiliary Buffer-spring. | 13. Drawbar Guides.          | 19. Draw-rod.           |
| 7. Drawbar Bolt.            | 14. Drawbar Follower-plates. | 20. Coupling-pin.       |

(Parts in Roman type, not shown in this draw-gear.)  
(A new style of draw-gear, the present standard of this road, is shown in Figs. 426-427.)

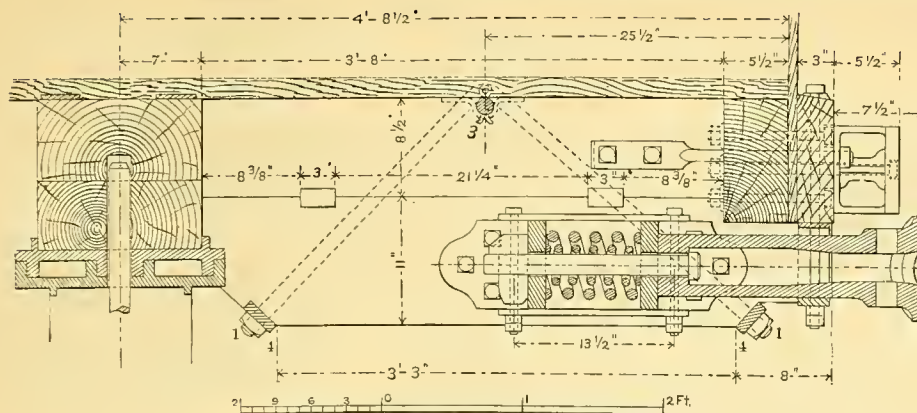


Fig. 391. Longitudinal Section.

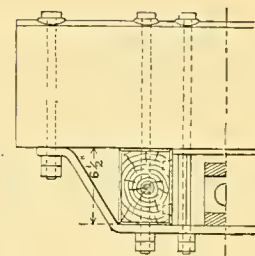
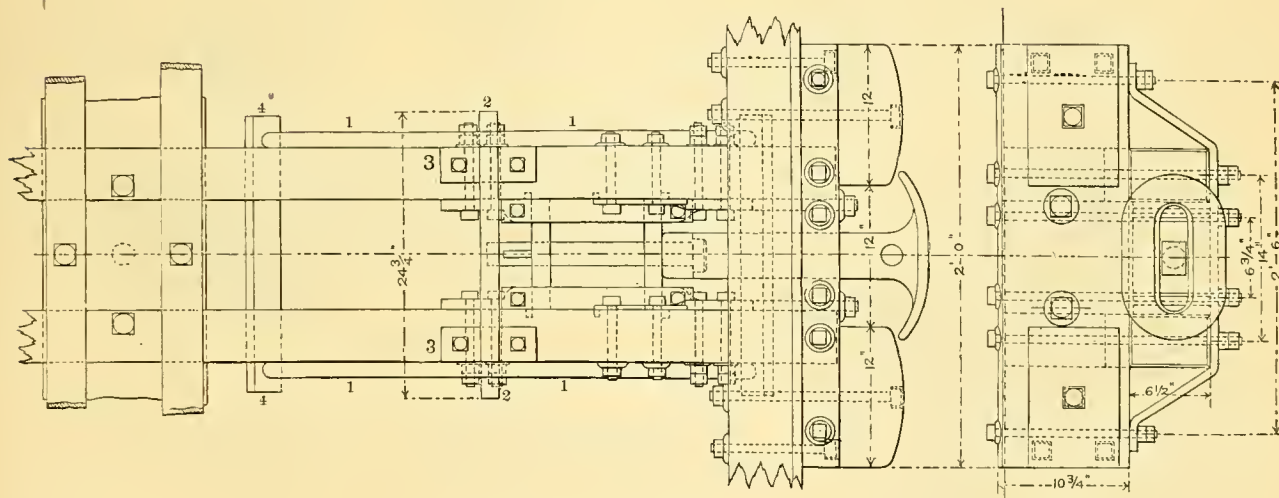
Fig. 392.  
Transverse Section.

Fig. 393. Inverted Plan.

Fig. 394. End Elevation.

FREIGHT CAR DRAW-GEAR, NORFOLK &amp; WESTERN RAILROAD.

## NAMES OF PARTS SPECIAL TO THIS GEAR.

1. Draw-timber Carry-iron.
2. Draw-timber Carry-iron Pin.

3. Draw-timber Carry-iron Pin-plates.
4. Draw-timber Carry-iron Washer-plates.



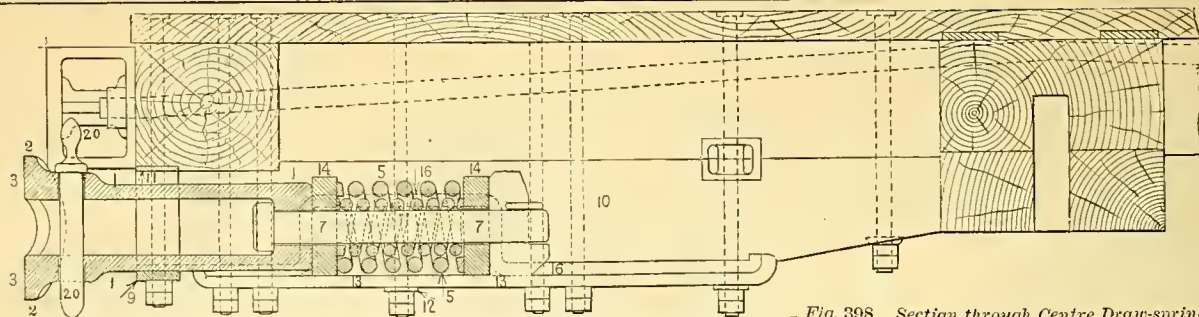


Fig. 395. Longitudinal Section.

Fig. 398. Section through Centre Draw-spring.

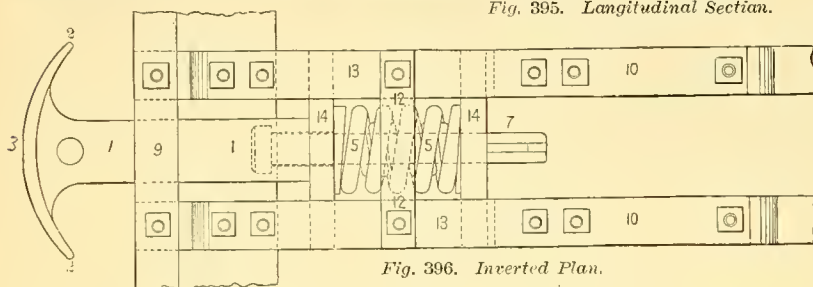


Fig. 396. Inverted Plan.

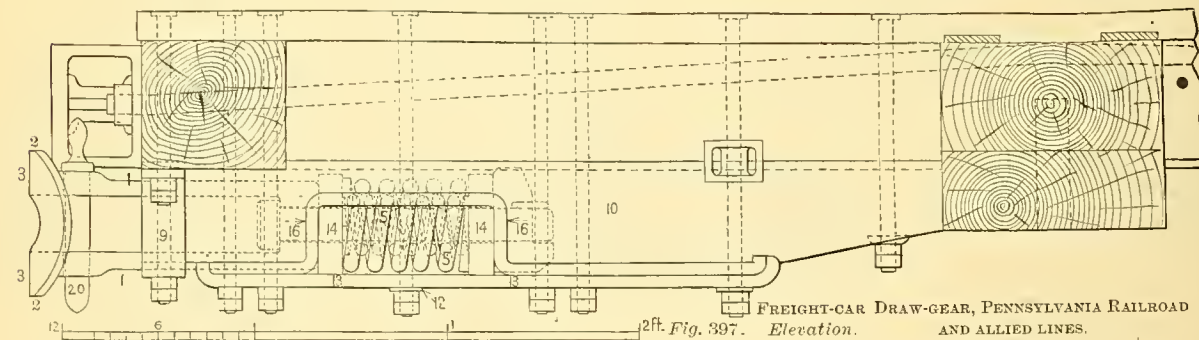
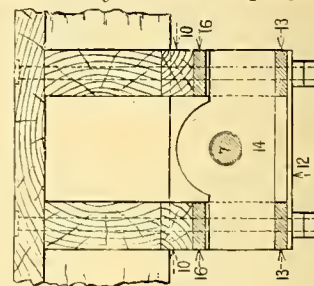


Fig. 397. Elevation.

FREIGHT-CAR DRAW-GEAR, PENNSYLVANIA RAILROAD AND ALLIED LINES.

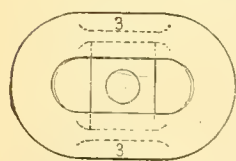


Fig. 399.

End View of Drawbar Head.

NAMES OF PARTS OF DRAW-GEAR: Figs 395-400.

1. Drawbar.
2. Drawbar Face-plate.
3. Drawbar Head.
4. Drawbar Carry-iron.
5. Draw-spring.
6. Draw-timber.
7. Draw-timber Guard.
8. Draw-timber.
9. Draw-timber.
10. Draw-timber.
11. Draw-timber.
12. Draw-timber.
13. Draw-timber.
14. Draw-timber.
15. Draw-timber.
16. Draw-timber.
17. Draw-timber.
18. Draw-timber.
19. Draw-timber.
20. Coupling-pin.

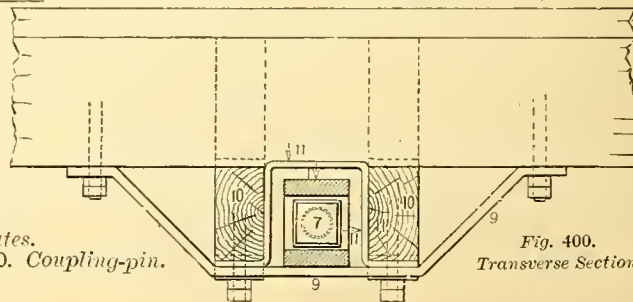


Fig. 400. Transverse Section.

(At the Teuth Annual Convention of the Master Car-Builders' Association, New York, 1876, the mode of attachment of drawbars at their rear end, shown in Figs. 401-402, was recommended for general use; and all future application of such attachments below the timber under the car-bodies, in the manner "alluded to in report of Committee," were discontinued. This drawing, however, is now superseded by the plan below, so far as the two differ from each other.)

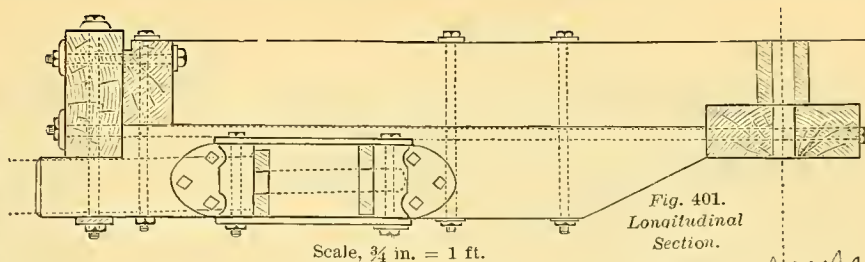


Fig. 401.  
Longitudinal  
Section.

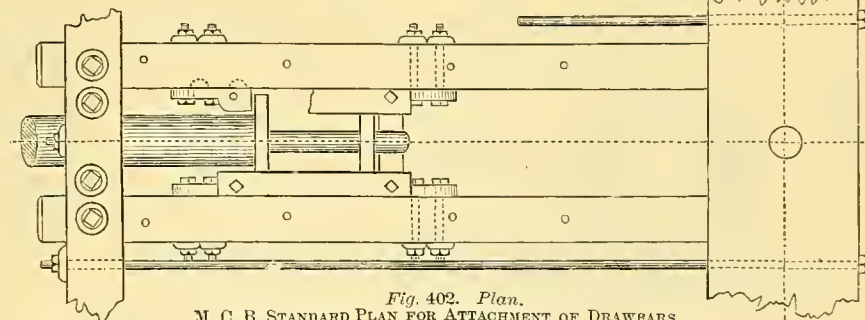


Fig. 402. Plan.  
M. C. B. STANDARD PLAN FOR ATTACHMENT OF DRAWBARS  
(see Note at side).

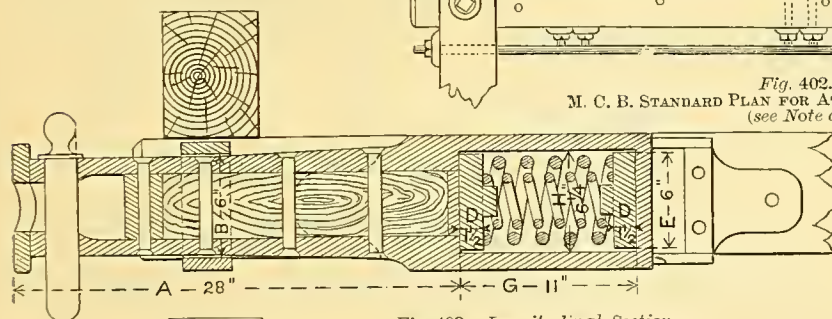


Fig. 403. Longitudinal Section.

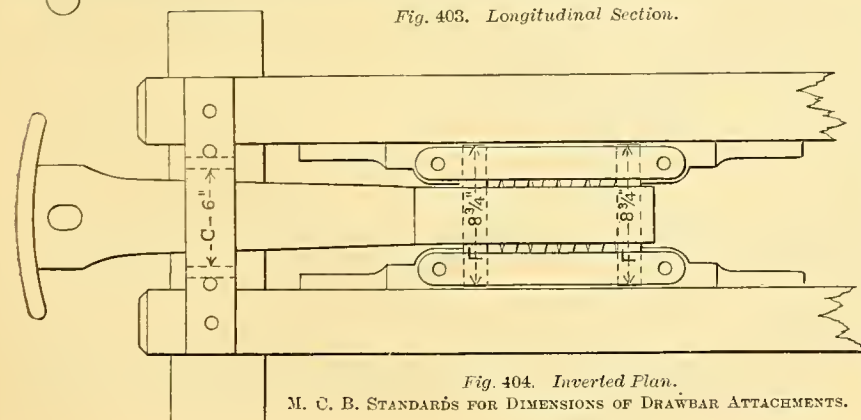


Fig. 404. Inverted Plan.  
M. C. B. STANDARDS FOR DIMENSIONS OF DRAWBAR ATTACHMENTS.

Adopted at 13th Annual Convention of the Master Car-Builders' Association, Chicago, 1879, as follows:

Length, *A*, from the end of drawbar to the first follower-plate to be 28 in.

Depth, *B*, at outer yoke in drawbar carry-iron, 6 in.

Width, *C*, for drawbar carry-iron or yoke, 6 in.

Follower-plates to be wrought-iron, rectangular in form; thickness, *D*, to be  $1\frac{1}{2}$  in.; width, *E*, 6 in., and length, *F*,  $8\frac{3}{4}$  in.

Length, *G*, of the HOUSE OF THE DRAWBAR, 11 in., and width, *H*,  $6\frac{1}{4}$  in.

Pin-hole in drawbar to take a pin  $2 \times 1\frac{1}{2}$  in.

When a STRAP (Fig. 450) is used at back end of drawbar, to have a clear space of 11 in. long and  $6\frac{1}{4}$  in. wide. When a SPINDLE (Fig. 449) is used, to be 2 in. diameter, 17 in. long from under side of head to outer edge of key; key to be  $2\frac{1}{2}$  in. wide and  $\frac{1}{2}$  in. thick.

The drawbars to be so placed in the cars as to locate the coupling-pins not less than five inches from the centre to the face of the dead-woods.

(As to the distance, *K*, the intention of the action taken by the Convention is doubtful.)

At the same meeting it was recommended that the CAPACITY OF DRAW- AND BUFFER-SPRINGS should not be less than 18,000 lbs. Also, that when the CONTINUOUS DRAWBAR (Figs. 424-7) is used, the length and size of drawbar shall be the same as above.

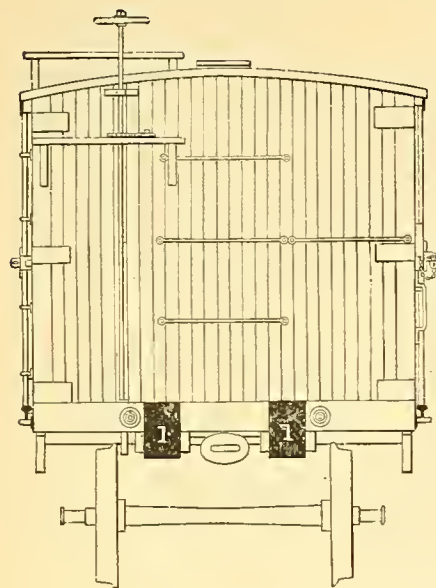


Fig. 405.  
1-1. DEAD-BLOCKS.

(These attachments are also, by increasing usage, distinguished simply as SINGLE and DOUBLE DEAD-BLOCKS, as in the formal action of the M. C. B. Association below.)

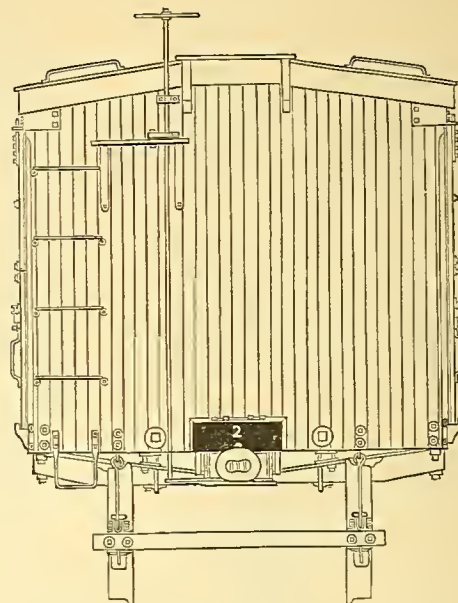


Fig. 406.  
2. BUFFER-BLOCK.

#### STANDARD SINGLE AND DOUBLE DEAD-BLOCKS

Recommended at the 16th Annual Convention of the Master Car-Builders' Association, Philadelphia, June, 1882, were amended at the 18th Annual Convention, Saratoga, 1884, to the form shown in Fig. 107, as follows:

DOUBLE DEAD-BLOCKS to be 8 in. square on the face, and 6 in. thick, to be placed 22 in. apart from centre to centre, and to have 14 in. space between them (being 2 inches wider apart than the former standard).

SINGLE DEAD-BLOCKS to be not less than 30 in. long, 7 in. thick and 8 in. deep, measured vertically (being 2 inches longer than the former standard).

These changes were submitted to letter-ballot and approved, 1884.

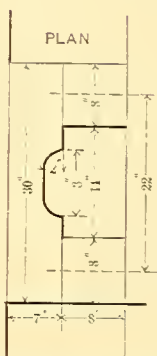


Fig. 407. M. C. B. STANDARD DIMENSIONS OF SINGLE AND DOUBLE DEAD-BLOCKS.

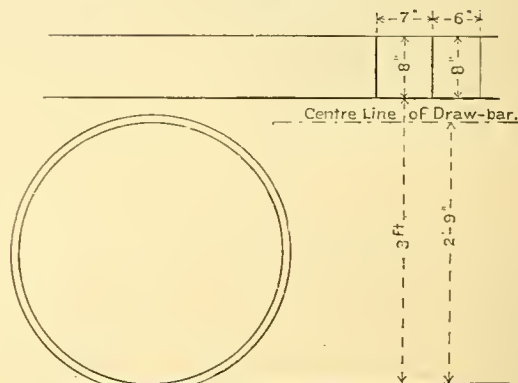


Fig. 408.

#### M. C. B. STANDARD HEIGHT OF DRAWBARS.

Recommended at the 5th Annual Convention, Richmond, 1872, 2 ft. 9 in. Qualified at the 18th annual meeting, Saratoga, 1884, as meaning 2 ft. 9 in. when the car is new and unloaded.



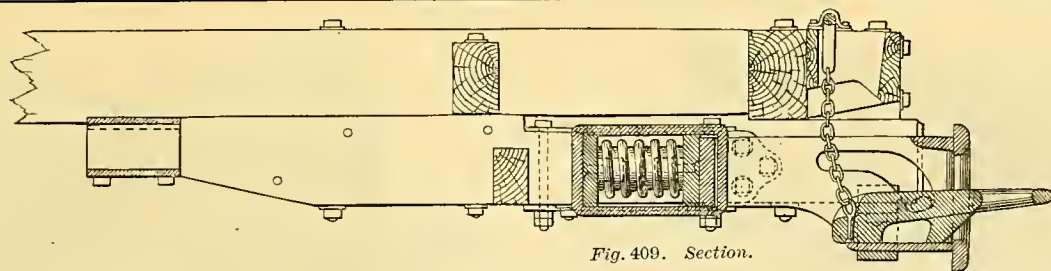
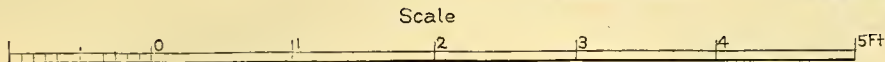


Fig. 409. Section.



[ NOTE.—The couplers shown in Figs. 409-423; together with the WILSON-WALKER and CONWAY-BALL couplers (not shown for lack of drawings), are those recommended for further trial by the Master Car-builders' Association, but are none of them as yet in general use. See AUTOMATIC CAR-COUPLER in Dictionary.

Figs. 409-411.

AMES AUTOMATIC FREIGHT CAR COUPLER.  
(Showing Slotted Draw-head, Hooked Coupling-link,  
Uncoupling-rod and Uncoupling-chain.)

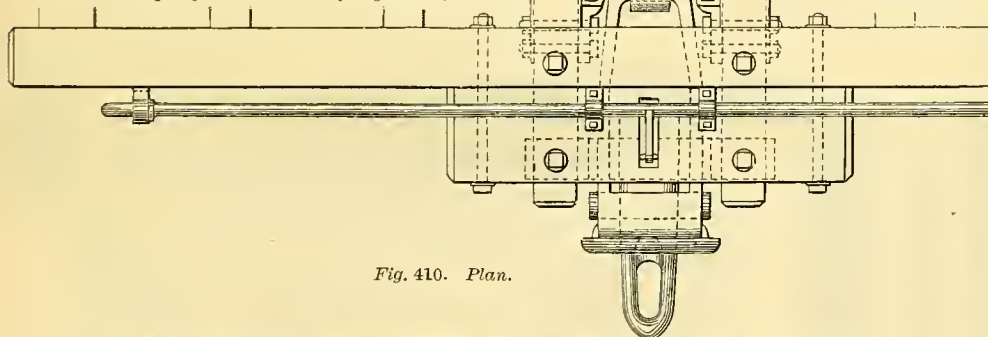


Fig. 410. Plan.

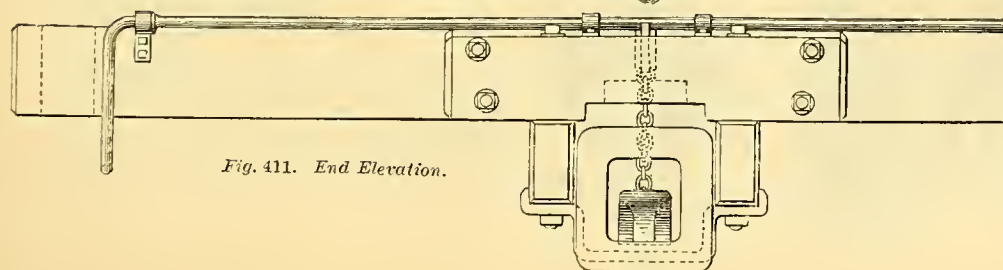


Fig. 411. End Elevation.

Fig. 412.

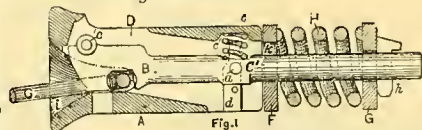


Fig. 1

Fig. 413.

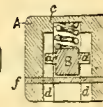


Fig. 3

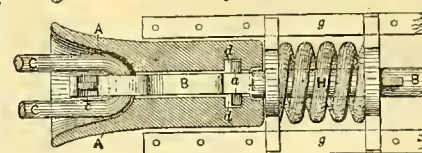


Fig. 2

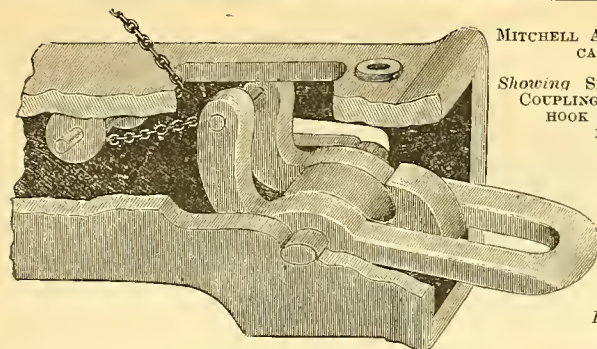
Fig. 4

Fig. 414½.

ARCHER AUTOMATIC FREIGHT CAR COUPLER.  
(Total weight of Drawbar and  
Draw-head, 130 lbs.)

NAMES OF PARTS OF  
ARCHER COUPLER; Figs.  
412-414½.

- A. Draw-head.
- B. Hook Drawbar.
- D. Uncoupling-gap.
- F. { Follower-plates.
- G. {
- H. Draw-spring.
- a. Drawbar Lugs.
- c. Drawbar Spring.
- d. Drawbar Lug-grooves.
- f. Drawbar Rivet-stop.



MITCHELL AUTOMATIC FREIGHT-CAR COUPLER.

Showing SLOTTED DRAWHEAD, COUPLING-LINK, COUPLING-HOOK AND COUPLING-LINK PIN.

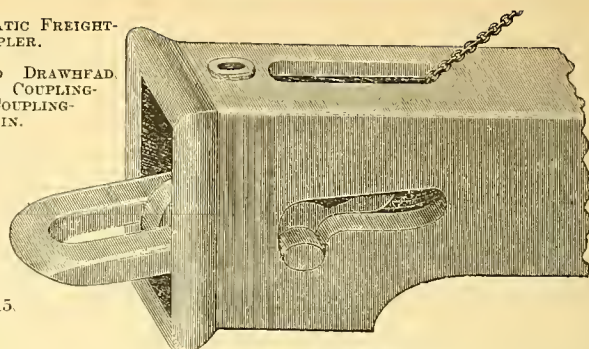


Fig. 415.

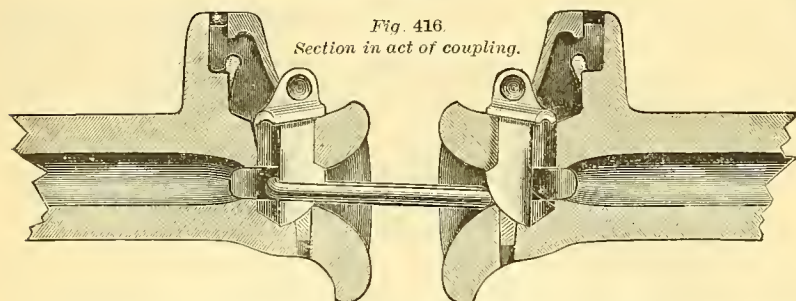


Fig. 416.  
Section in act of coupling.

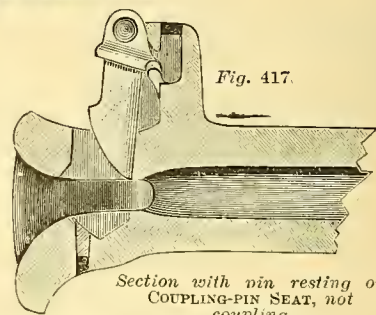


Fig. 417.

Section with pin resting on COUPLING-PIN SEAT, not coupling.

GIFFORD AUTOMATIC FREIGHT-CAR COUPLER, showing DRAWHEAD, BEVELED COUPLING-PIN AND COUPLING-PIN SEAT. (See also Figs. 515-516.)

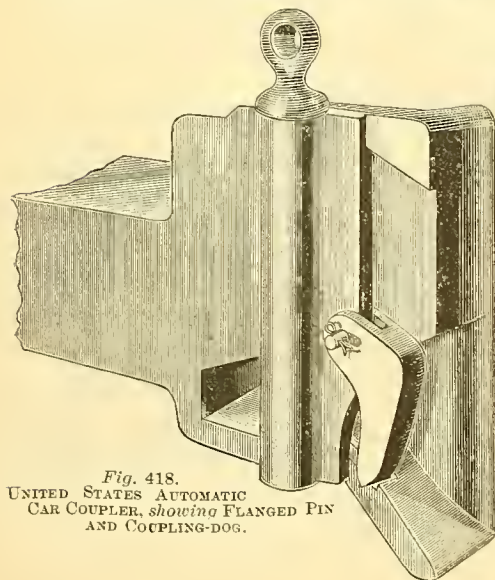


Fig. 418.  
UNITED STATES AUTOMATIC CAR COUPLER, showing FLANGED PIN AND COUPLING-DOG.

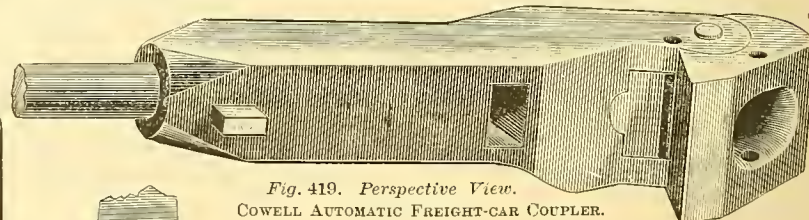


Fig. 419. Perspective View.  
COWELL AUTOMATIC FREIGHT-CAR COUPLER.

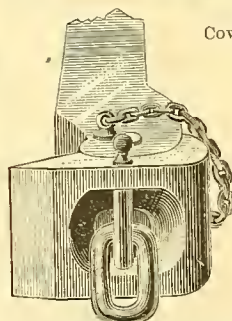
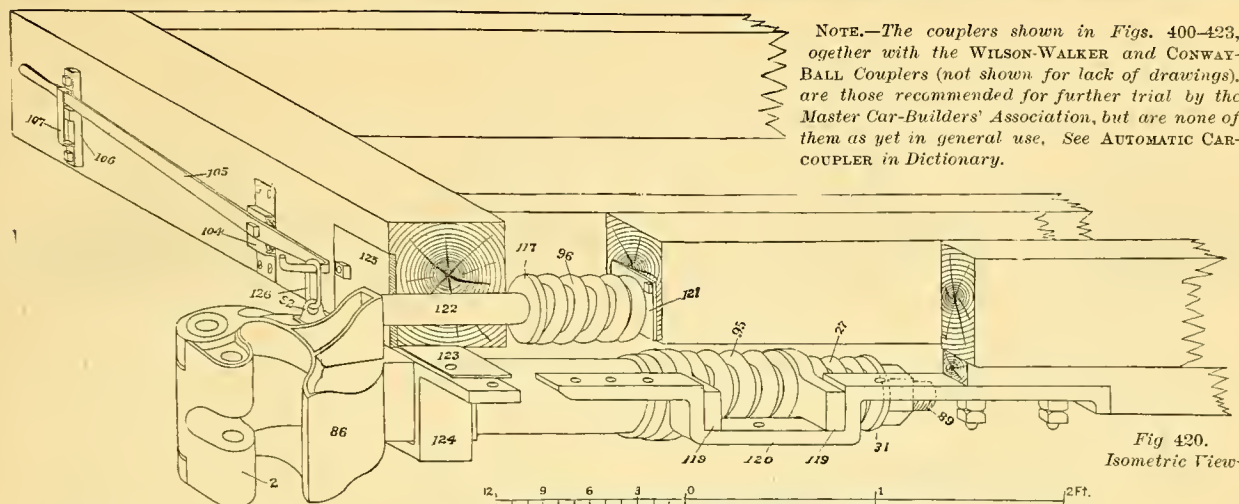


Fig. 419 1/2. Perspective End View, coupled with common links.

NAMES OF PARTS given with Passenger Draw-gear  
Figs. 537-541.

NOTE.—The couplers shown in Figs. 409-423, together with the WILSON-WALKER and CONWAY-BALL couplers (not shown for lack of drawings) are those recommended for further trial by the Master Car-Builders' Association, but are none of them as yet in general use. See AUTOMATIC CAR COUPLER in





NOTE.—The couplers shown in Figs. 400-423, together with the WILSON-WALKER and CONWAY-BALL Couplers (not shown for lack of drawings), are those recommended for further trial by the Master Car-Builders' Association, but are none of them as yet in general use. See AUTOMATIC CAR-COUPLER in Dictionary.

Fig. 420.  
Isometric View.

JANNEY FREIGHT-CAR COUPLER.  
(Janney and Janney-Miller Passenger Car-couplers, shown in Figs. 542-635.)

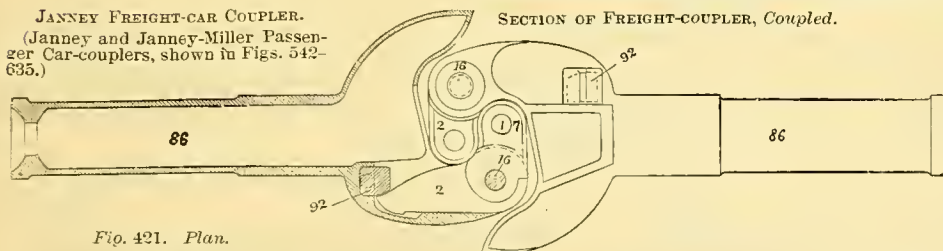


Fig. 421. Plan.

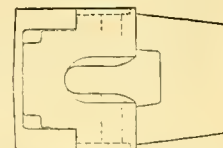


Fig. 422. End View of Coupler.

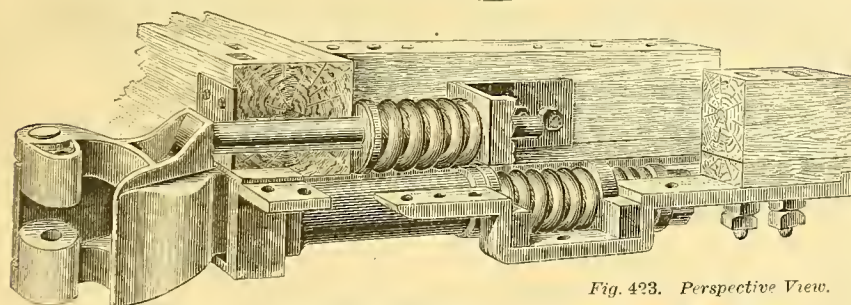


Fig. 423. Perspective View.

NAMES OF PARTS OF JANNEY FREIGHT-CAR COUPLER; Figs. 420-423.

- 2. Janney Knuckle.
- 16. Janney Knuckle-pin.
- 17. Janney Coupling-pin.

- 27. Janney Centre Buffer-spring.
- 31. Janney Draft-washer.
- 86. Freight Coupler.\*

- 89. Freight Draft-bolt.\*
- 92. Freight Coupler-pin.\*
- 95. Freight Main Draft-spring.\*
- 96. Freight Buffer-spring.
- 104. Freight Lever Fulcrum-plate
- 105. Freight Lever.
- 106. Freight Lever-catch.
- 107. Freight Lever-plate.
- 117. Freight Buffer-washer.
- 119. Freight Follower.
- 120. Freight Draft-iron.
- 121. Freight Buffer-spring Plate.
- 122. Freight Buffer.
- 123. Freight Chasing-plate.
- 124. Freight Stirrup.
- 125. Freight Face-plate.
- 126. Drop-pin Link.

\* Shown separately in Figs. 602-635.

(The reference numbers are the same as used in the makers' lists.)



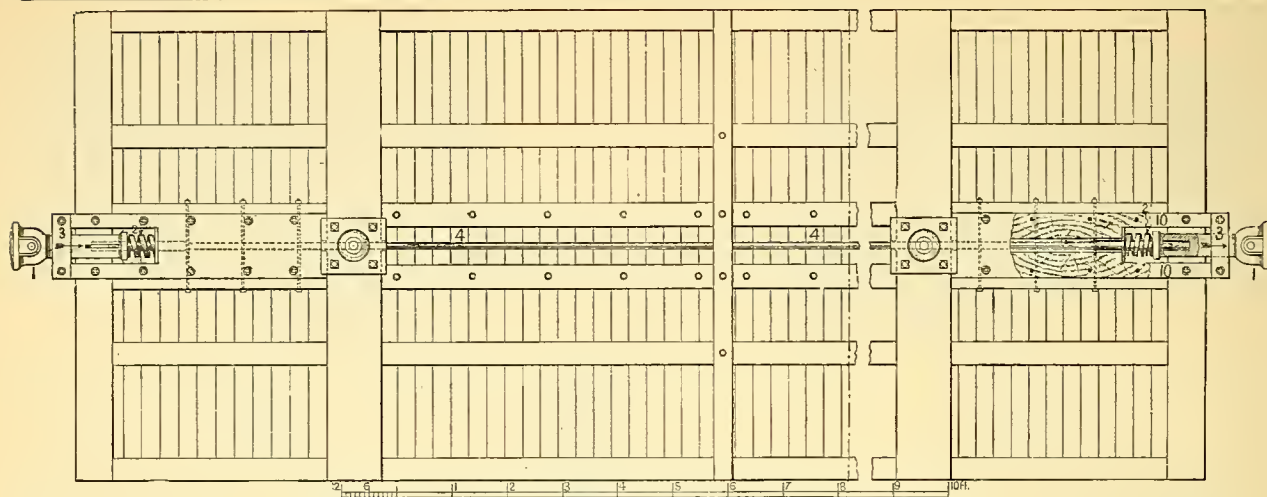


Fig. 424. Inverted Plan.

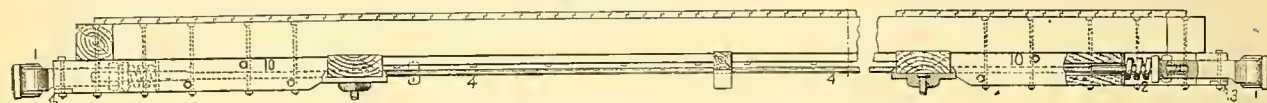


Fig. 425. CONTINUOUS DRAWBAR. Longitudinal Section.  
1. Drawbar. 2. Draw-spring. 3. Drawbar Carry-iron. 4. Draw-rod. 10. Draw-timber.

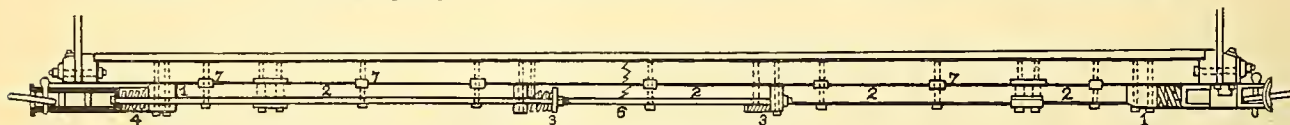


Fig. 426. Side Elevation.

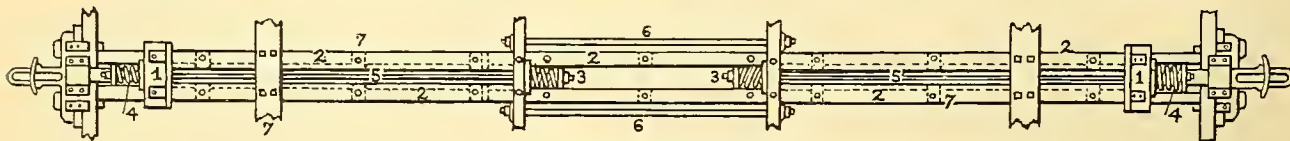


Fig. 427. Inverted Plan.

HOIT DOUBLE-SPRING DRAW-GEAR.

- |   |  |
|---|--|
| 1. Follower-plate Block or Buffer-spring Block. | 5. Draw-rod.                                 |
| 2. Double-spring Drawbar Timber.                | 6. Cross-frame Tie-rods or Centre Draw-rods. |
| 3. Draw-spring.                                 | 7. Packing Blocks.                           |
| 4. Buffer-spring.                               |  |

(The Hoit draw-gear is shown attached to car-bodies in Figs. 93-96 and 113-115.



Fig. 428.  
Side Elevation.

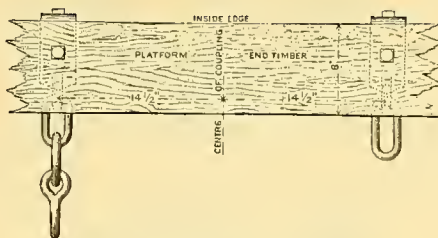
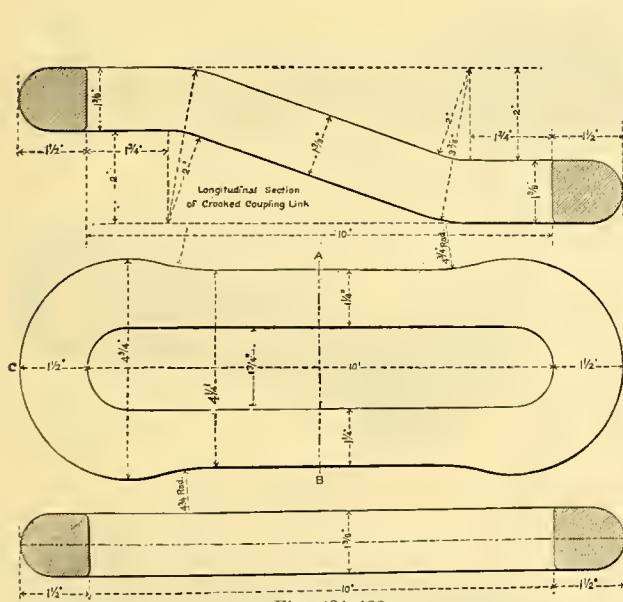


Fig. 429.  
Elevation of Platform End-timber.



Fig. 430.  
Side Elevation.

SAFETY COUPLING-CHAIN ATTACHMENT FOR PASSENGER CARS, NEW YORK CENTRAL & HUDSON RIVER RAILROAD AND ALLIED LINES.



Figs. 431-433.  
Plan and Longitudinal Sections of Coupling-link.

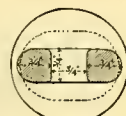


Fig. 434.  
Section of Eye  
on E F.

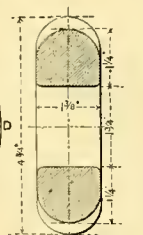


Fig. 435.  
Transverse Sec-  
tion on A B.

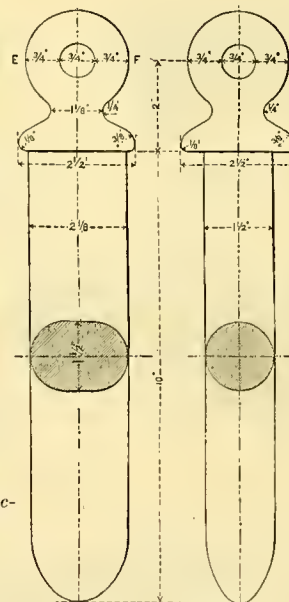


Fig. 436.  
FLAT EYE-HEAD  
COUPLING-PIN.

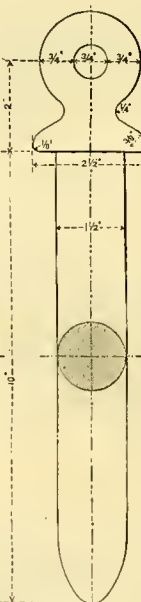


Fig. 437.  
ROUND EYE-HEAD  
COUPLING PIN.



Fig. 438.  
SOLID-HEAD  
COUPLING-PIN.

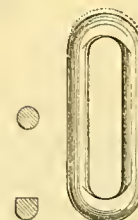


Fig. 439.  
BRIDGE'S  
COUPLING-LINK.

STANDARD COUPLING LINKS AND PINS, NEW YORK CENTRAL & HUDSON RIVER RAILROAD AND ALLIED LINES.

(Scale,  $\frac{1}{4}$  full size.)

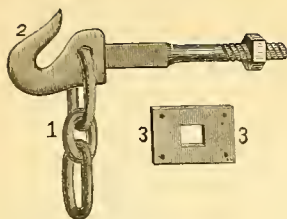


Fig. 440.  
DRAW-HOOK.

1. Chain Coupling-links or Triple Coupling link.
2. Draw-hook.
3. Draw-hook Plate.



Fig. 441.  
COUPLING-LINK.  
(Common form; see Figs. 432-3 for improved form.)

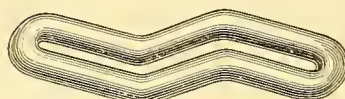


Fig. 442.  
CROOKED COUPLING-LINK  
(Common form; see Figs. 431-2 for improved form.)



Fig. 443.  
SOLID-HEAD  
COUPLING-PIN.

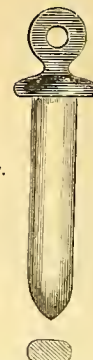


Fig. 445. Section.  
EYE-HEAD, FLAT  
COUPLING-PIN.



Fig. 446.  
BENT-HEAD  
COUPLING-PIN.

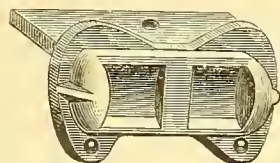


Fig. 447.  
DRAWBAR SIDE-CASTING  
One of many forms; see Figs. 401-404.)

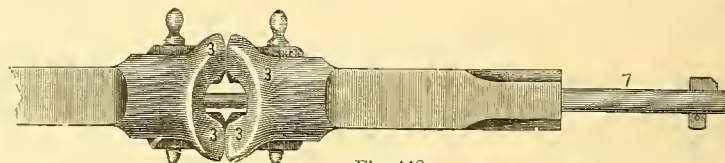


Fig. 448.  
SAFFORD DRAWBAR.  
3. Drawbar Head. 7. Drawbar Bolt.  
(See also Figs 453-4, 459-60, etc.)

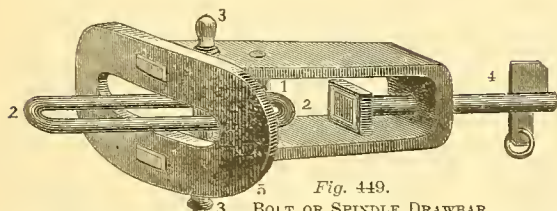


Fig. 449.  
BOLT OR SPINDLE DRAWBAR  
1. Coupling-link Rivet. 4. Drawbar Bolt.  
2. Fast Coupling-link. 5. Drawbar Face-plate.  
3. Fast Coupling-pin.

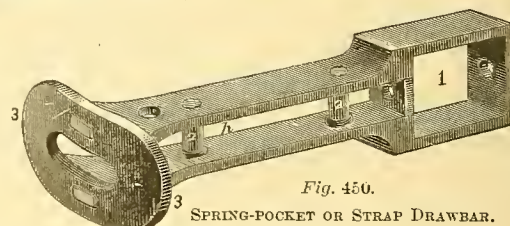


Fig. 450.  
SPRING-POCKET OR STRAP DRAWBAR.  
1. Drawbar Spring-pocket.  
2. Drawbar Distance-piece.  
3. Drawbar Face-plate.

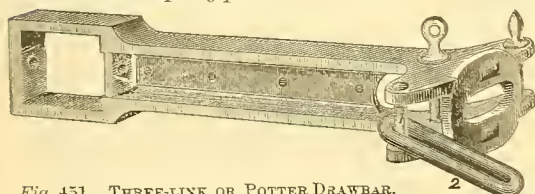


Fig. 451. THREE-LINK OR POTTER DRAWBAR.  
1. Coupling-link Rivet. 2. Fast Coupling-link.  
(Also made in cast-iron; see Figs. 467-S.)

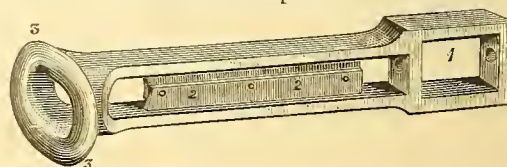
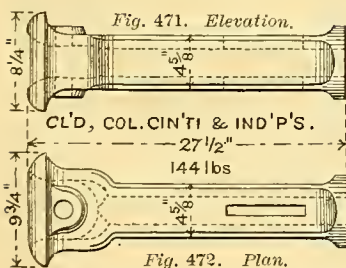
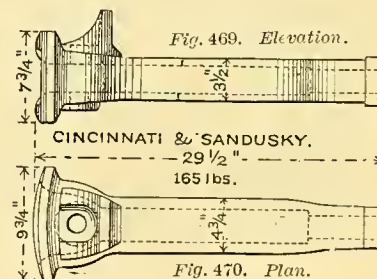
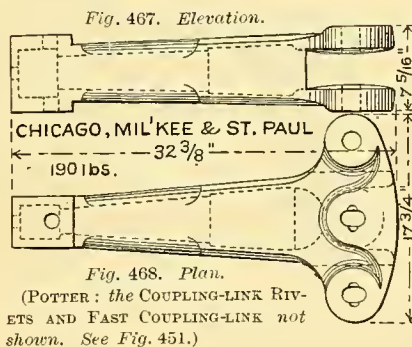
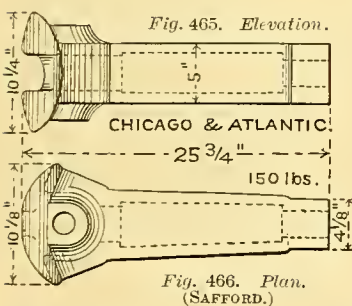
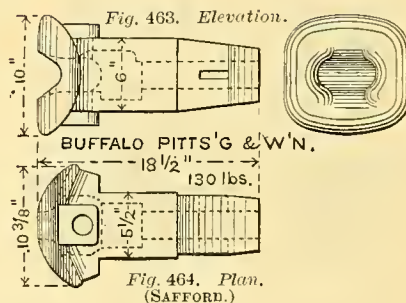
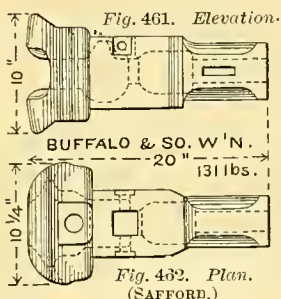
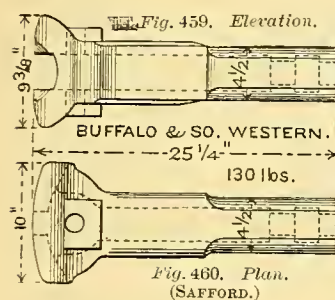
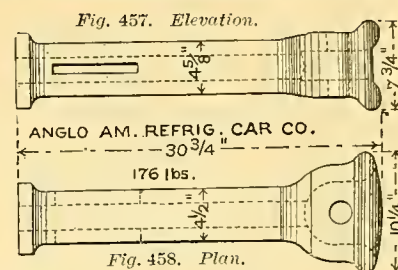
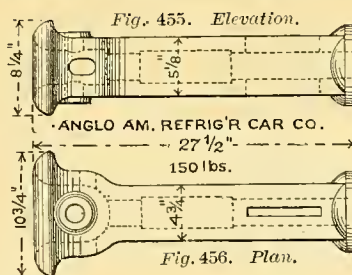
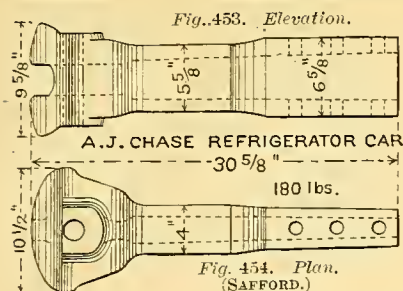


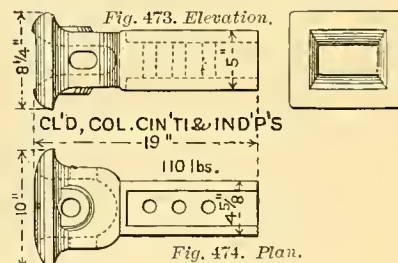
Fig. 452. SOLID-HEAD DRAWBAR.  
1. Drawbar Pocket. 2. Drawbar Distance-piece.  
3. Drawbar Head.

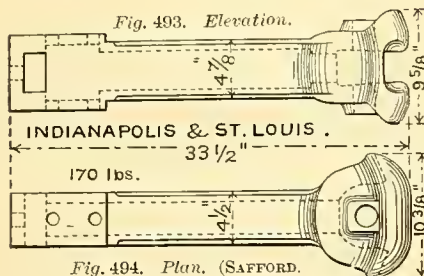
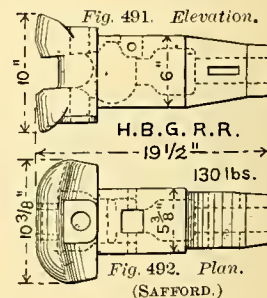
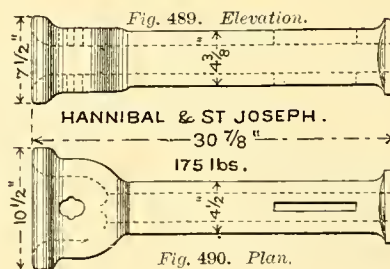
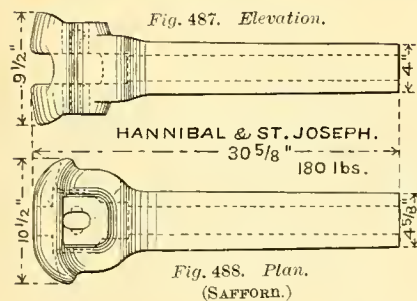
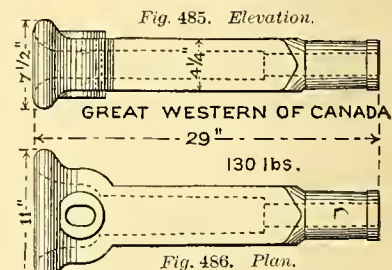
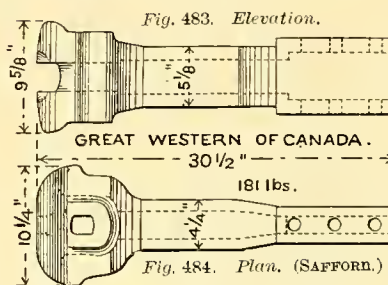
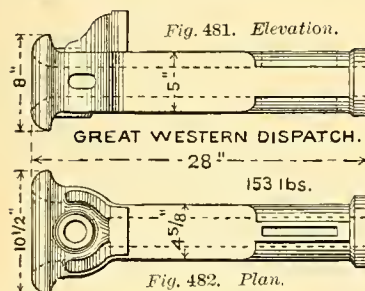
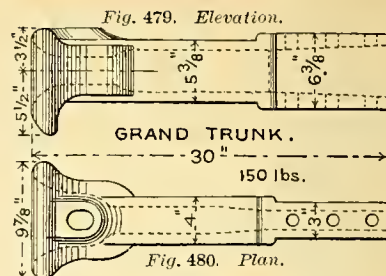
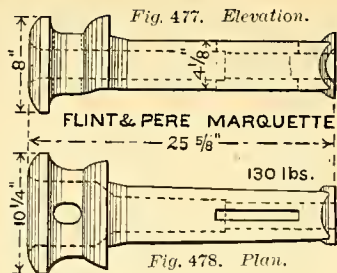
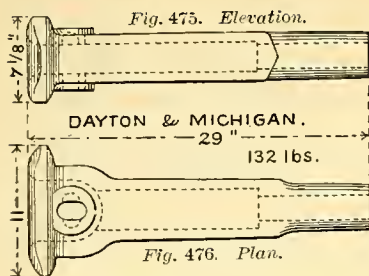




## STANDARD CAST-IRON DRAWBARS.

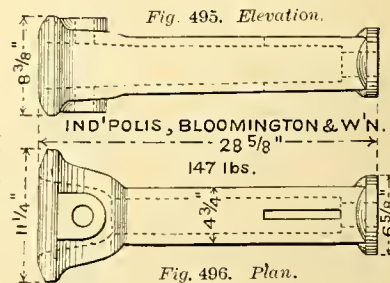
(The 42 drawbars shown on this and the three following pages are those carried in stock for repairing purposes on the New York, Lake Erie & Western Railroad, and include nearly all the leading types.)

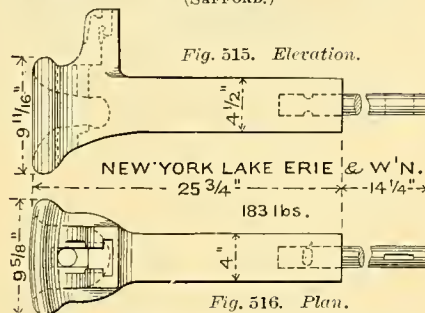
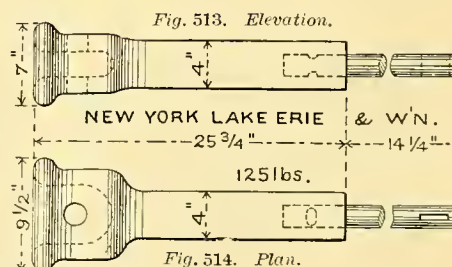
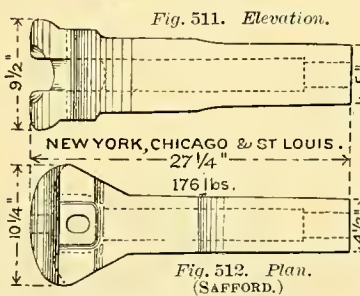
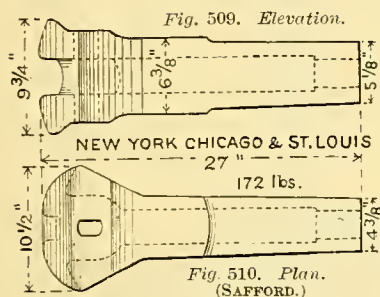
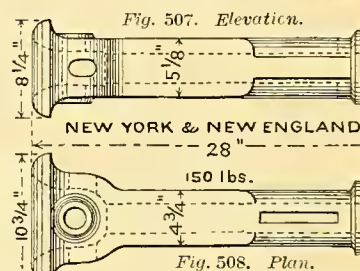
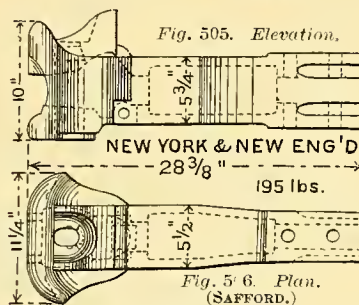
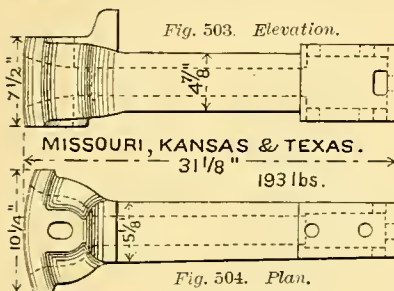
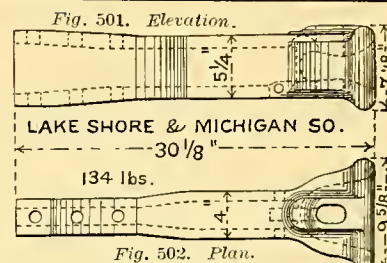
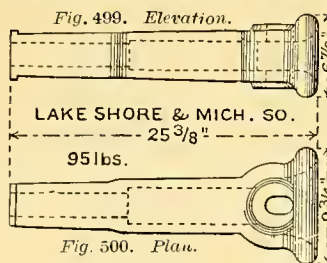
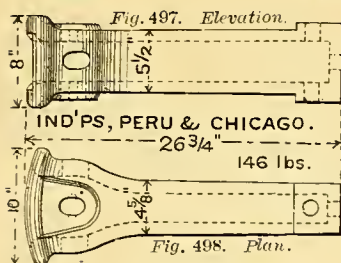




STANDARD CAST-IRON DRAWBARS —See note on preceding page.

Figs. 469, 477, 481, 505 and 527 show DRAWBAR SAFETY-LUGS. The horizontal hole in side of drawbar in Figs. 455, 481, 497, 507 and 533 is for no especial purpose, unless to loosen a link which may bind fast.



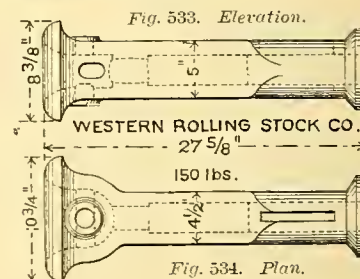
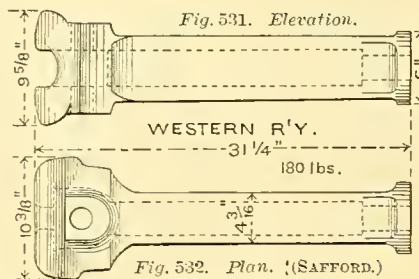
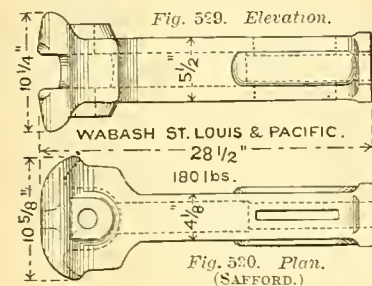
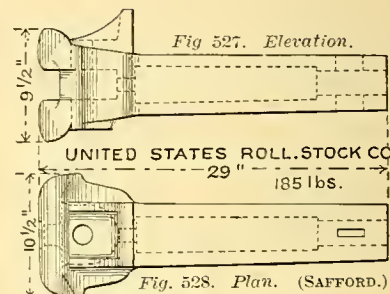
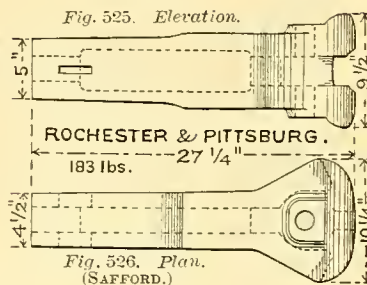
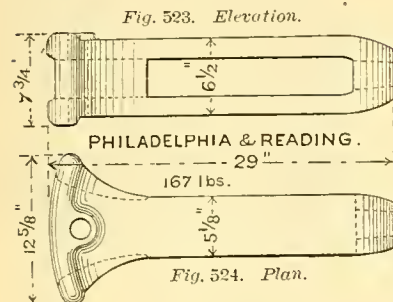
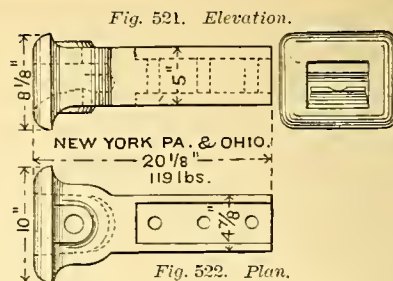
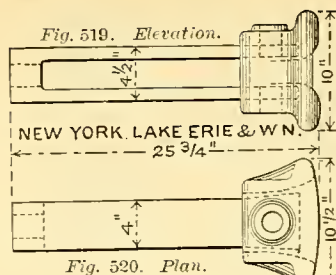
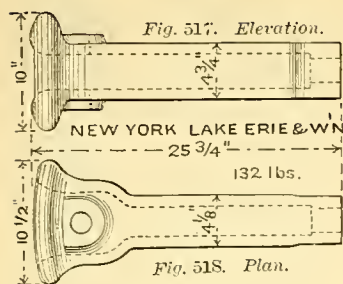


STANDARD CAST-IRON  
DRAW-BARS.

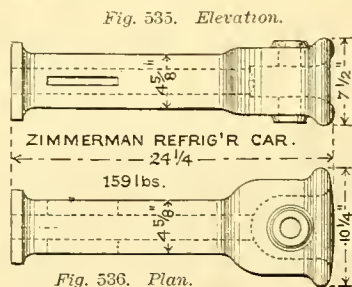
(See notes on two preceding pages.)

GIFFORD AUTOMATIC; See Figs. 416-417.





STANDARD CAST-IRON  
DRAWBARS.



(See notes on second and third  
pages back.)

Fig. 538.

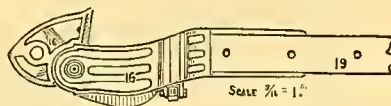
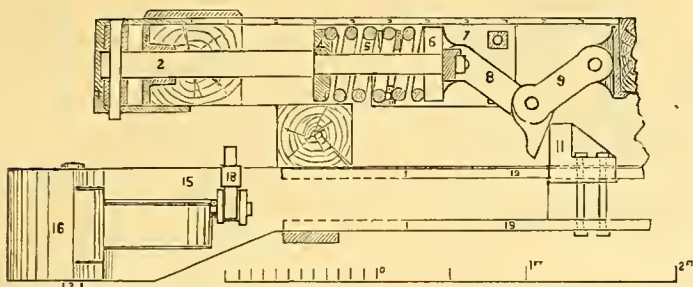


Fig. 539.

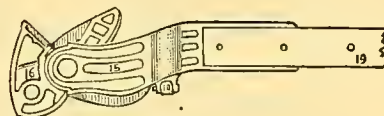


Fig. 540.

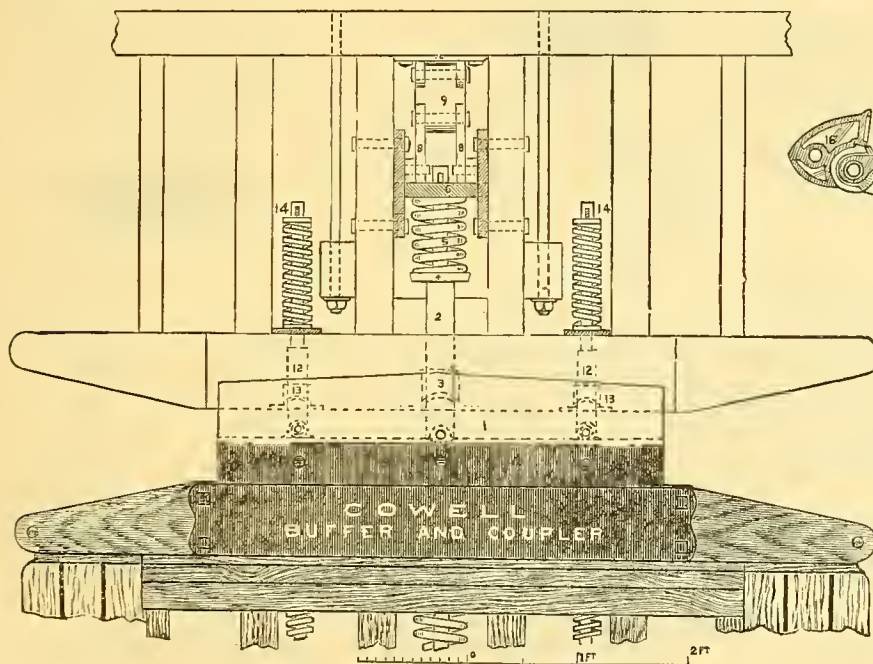


Fig. 541.

Figs. 537-541.

COWELL PASSENGER PLATFORM AND COUPLER.  
(Freight Coupler shown in Figs. 419-419½.)

## NAMES OF PARTS OF COWELL COUPLER.

- |                   |                   |                |                |
|-------------------|-------------------|----------------|----------------|
| 1. Buffer-plate.  | 6. Follower.      | 11. Set-block. | 16. Draw-head. |
| 2. Buffer-stem.   | 7. Side-plates.   | 12. Side-arms. | 17. Lock.      |
| 3. Buffer-socket. | 8. Knuckle-arms.  | 13. Sockets.   | 18. Lever.     |
| 4. Washer.        | 9. Knuckle.       | 14. Springs.   | 19. Straps.    |
| 5. Buffer-spring. | 10. Knuckle-seat. | 15. Draw-bar.  |                |

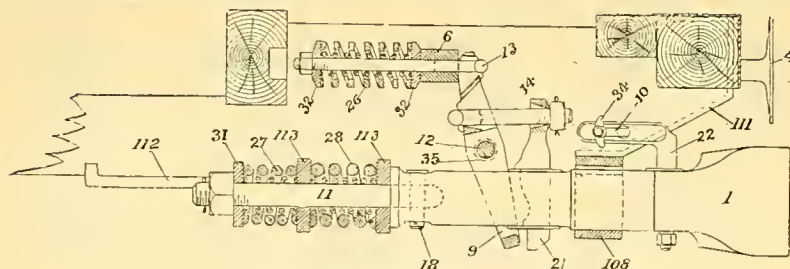


Fig. 542. Longitudinal Section.  
JANNEY PASSENGER PLATFORM AND COUPLER.

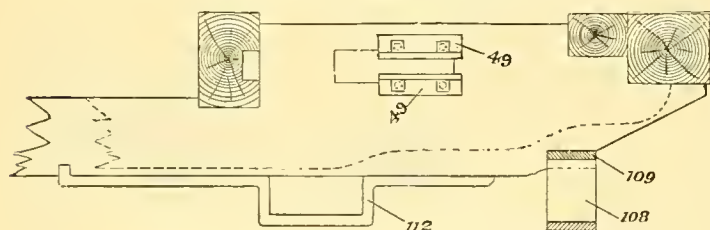
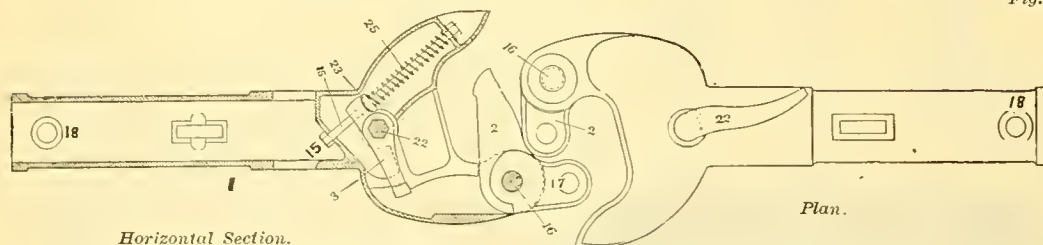


Fig. 543. MAIN KNEE-TIMBER AND ATTACHED PARTS.



Horizontal Section.

Fig. 544. JANNEY PASSENGER COUPLER. (Section of Passenger Coupler set for coupling.)

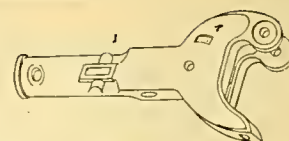


Fig. 545. PASSENGER COUPLER.



Fig. 546. BUFFER (Flat face).

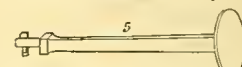


Fig. 547. BUFFER (Round face).

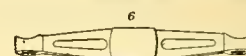


Fig. 548. EQUALIZER.

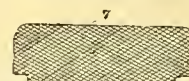


Fig. 549. FOOT-PLATE.

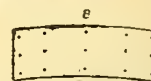


Fig. 550.  
END FACE PLATE.



Fig. 551.  
COMBINATION YOKE.

# NAMES OF PARTS; Figs. 542-554.

1. Pass'r Coupler.
2. Knuckle.
3. Catch.
4. Buffer (Flat Face).
5. Buffer (Round Face).
6. Equalizer.
7. Foot-plate.
8. End Face-plate.
9. Combination Yoke.

10. Pull-rod.
11. Draft-bolt.
12. Fulcrum-bolt.
13. Long T-bolt.
14. Short T-bolt.
15. Catch-spring Bolt.
16. Knuckle-pin.
17. Coupling-pin.
18. Tail-pin.
20. Platform-lever Pin.
21. Horn.
22. Catch-lever.
23. Half-oval Washer.
24. Platform Lever.
25. Catch Spring.
26. Centre Buffer-spring.
27. Auxiliary Draft-spring.
28. Main Draft-spring.

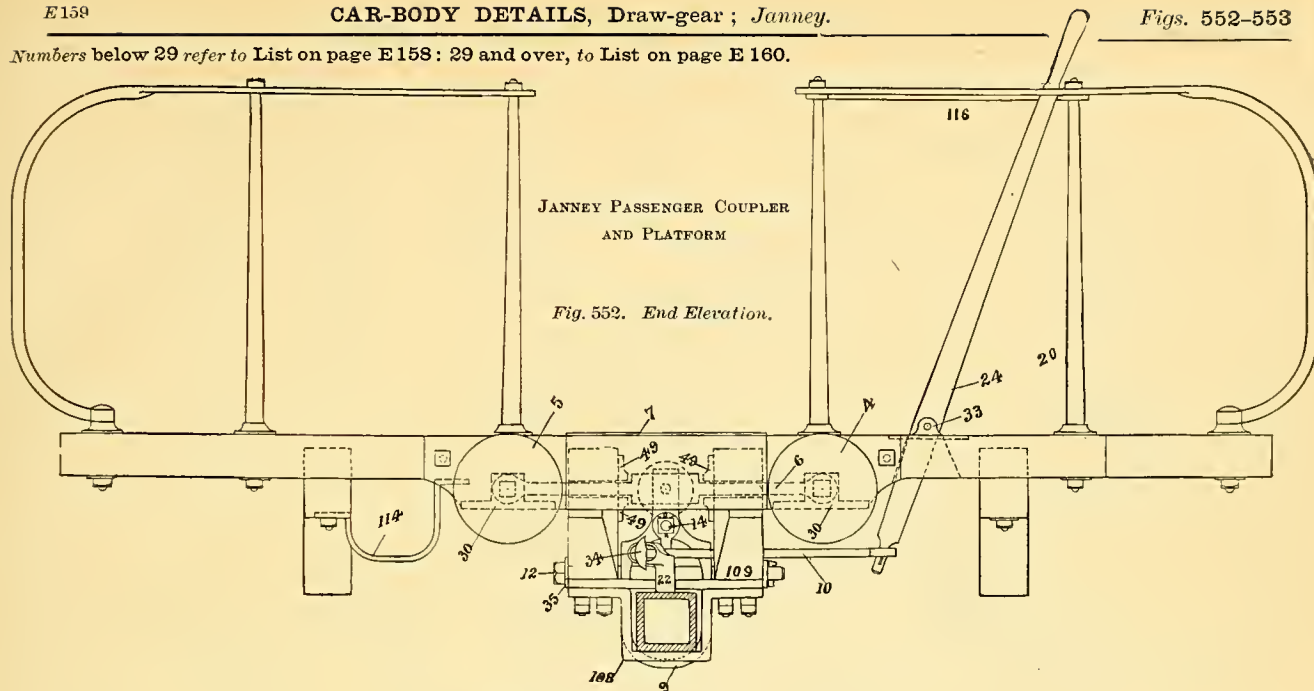
29. Miller Buffer-guide.
30. Janney Buffer-guide.
31. " Draft-washer.
32. " Centre-spring Washer.
33. " Platform - lever Jaw.

(Continued on second page ahead.  
Page E 160.)

(The reference numbers are the same as used in the maker's list.)



Numbers below 29 refer to List on page E 158 : 29 and over, to List on page E 160.



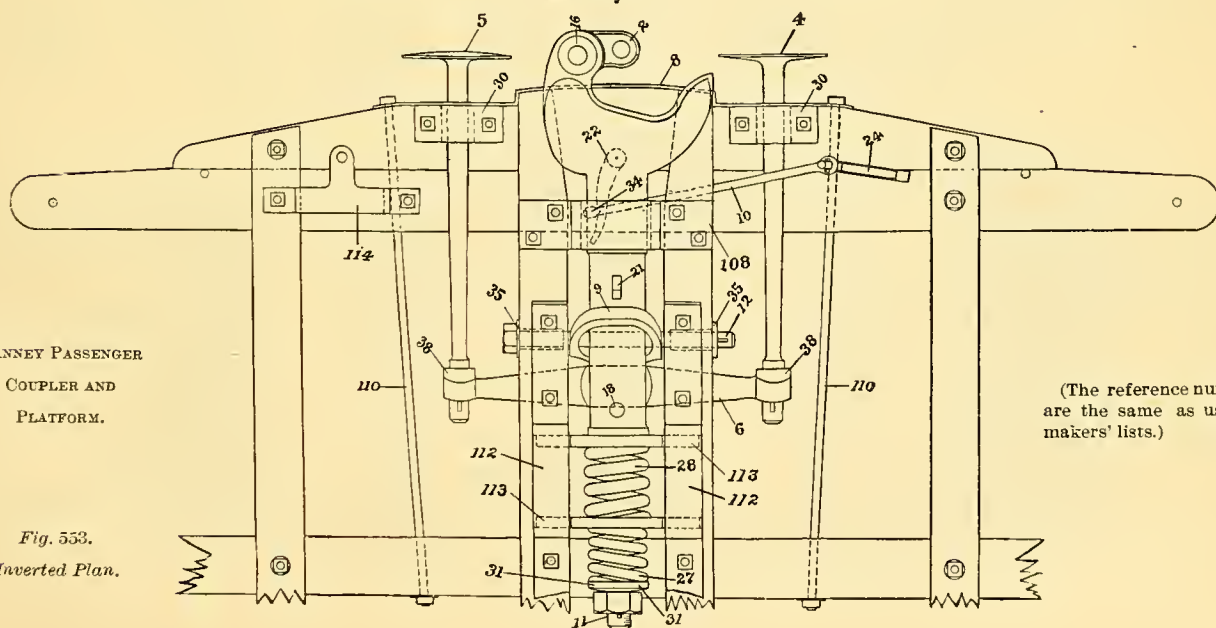
JANNEY PASSENGER COUPLER  
AND PLATFORM

Fig. 552. End Elevation.

JANNEY PASSENGER  
COUPLER AND  
PLATFORM.

(The reference numbers  
are the same as used in  
makers' lists.)

Fig. 553.  
Inverted Plan.



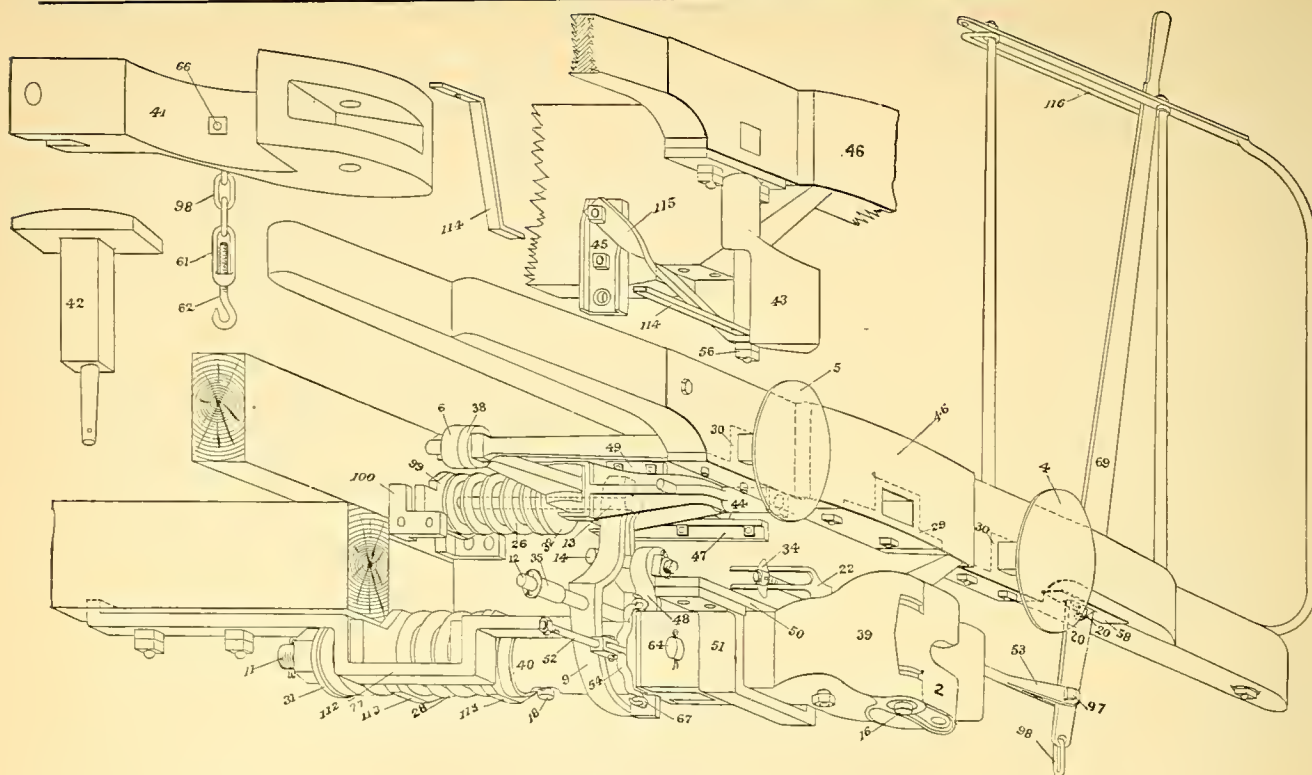
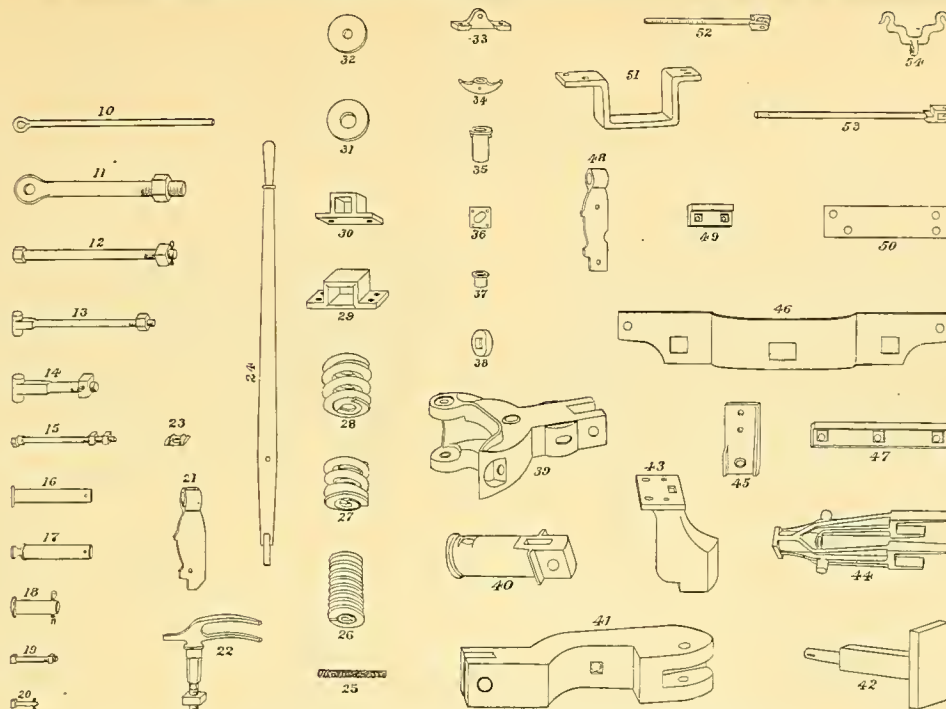


Fig. 554. Isometric View.  
JANNEY-MILLER COMBINATION COUPLER.

NAMES OF PARTS; Figs. 542-554. (Continued from second page back, E158.)

34. Janney Pull-rod Button.	50. Combination Chafing-plate.	97. Combination Lever Jaw-pin.
35. " Fulcrum-ferrule.	51. " Stirrup.	98. " Open Link for Miller Hook.
38. " Buffer-washer.	52. " Side-spring Bolt.	99. " Follower.
39. Combination Janney Head.	53. " Pull-rod.	100. " Follower-guide.
40. " Janney Barrel.	54. " Side-spring Stirrup.	108. Janney Stirrup.
42. " Miller Buffer.	56. " Miller Stop-bolt.	109. " Chafing-plate.
43. " Miller Stop.	58. " Platform-lever Jaw.	110. " Tie-bolt.
44. " Miller Buffer-yoke.	61. " Swivel.	111. " Knee-strap.
45. " Side Spring-plate.	62. " Swivel-hook.	112. " Draft-iron.
46. " End Face-plate.	64. " Connecting-pin.	113. " Follower.
47. " Large Equalizing-guide.	66. " Eye-bolt for Miller Hook.	114. " Brake-shaft Stand.
48. " Horn.	67. " Side-spring Eye-bolt.	115. " Combination Stop-brace.
49. " Small Equalizing-guide.	69. " Platform Lever.	116. " Lever-guard.

(The reference numbers are the same as used in makers' lists.)



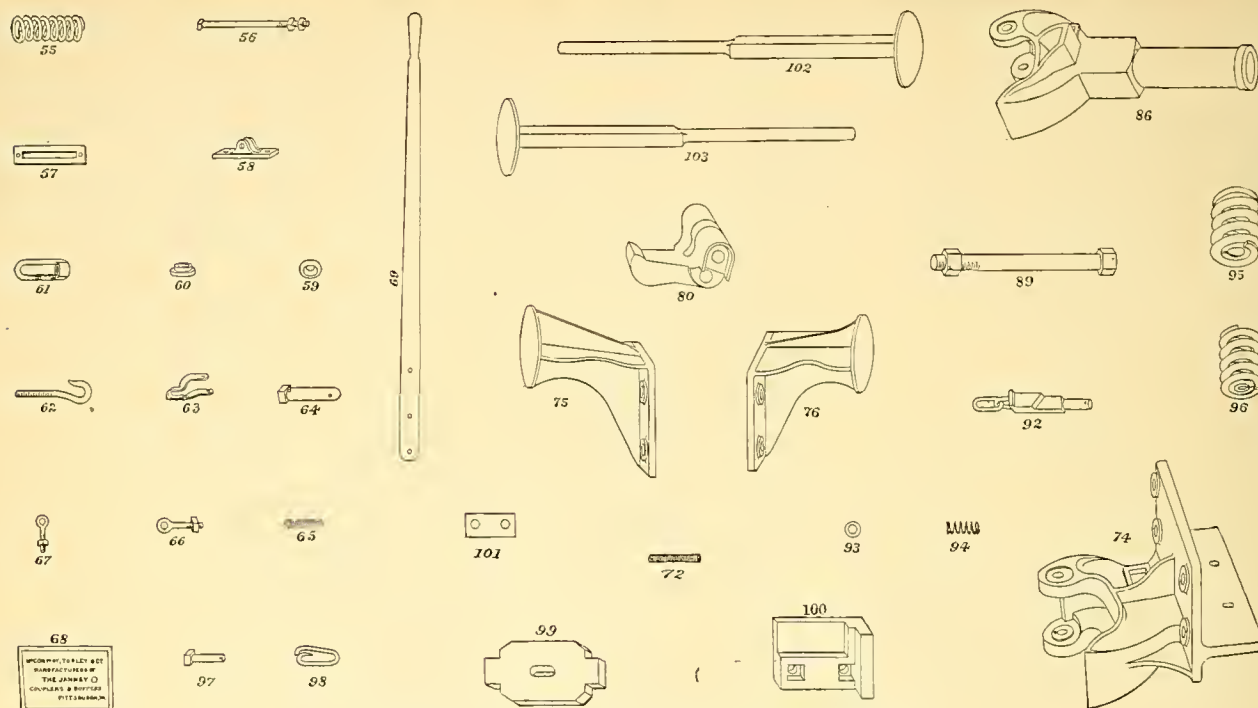
Figs. 555-601. DETAILS OF JANNEY AND JANNEY-MILLER COUPLERS.

## NAMES OF PARTS, JANNEY AND JANNEY MILLER DETAILS; Figs. 555-635.

2. Janney Knuckle.	24. Janney Platform Lever.	39. Combination Janney Head.
3. " Catch.	25. " Catch-spring.	40. " Janney Barrel.
10. " Pull-rod.	26. " Centre Buffer-spring.	41. " Miller Head.
11. " Draft-bolt.	27. " Auxiliary Draft-spring.	42. " Miller Buffer.
12. " Fulcrum-bolt.	28. " Main Draft-spring.	43. " Miller Stop.
13. " Long T-bolt.	29. Miller Buffer-guide.	44. " Miller Buffer-yoke
14. " Short T-bolt.	30. Janney Buffer-guide.	45. " Side-spring Plate.
15. " Catch-spring Bolt.	31. " Draft-washer.	46. " End Face-plate.
16. " Knuckle-pin.	32. " Centre-spring Washer.	48. " Horn.
17. " Coupling-pin.	33. " Platform-lever Jaw.	49. " Small Equalizing-guide.
18. " Tail-pin.	34. " Pull-rod Button.	50. " Chafing-plate.
19. " Horn-bolt.	35. " Fulcrum-ferrule.	51. " Stirrup.
20. " Platform Lever-pin.	36. " Pull-rod Plate.	52. " Side-spring Bolt.
21. " Horn.	37. " Thimble.	53. " Pull-rod.
22. " Catch-lever.	38. " Buffer-washer.	54. " Side-spring Stirrup.
23. " Half-oval Washer.		

(The reference numbers are the same as used in the makers' lists.)





Figs. 602-635. DETAILS OF JANNEY AND JANNEY-MILLER COUPLERS.

## NAMES OF PARTS, JANNEY AND JANNEY-MILLER DETAILS; Figs. 555-635 (Continued).

- |                                 |  |                                      |
|---------------------------------|--|--------------------------------------|
| 55. Combination Side-spring.    | 67. Combination Side-spring Eye-bolt.  | 94. Freight Coupler-pin Spring.      |
| 56. " Miller Stop-bolt.         | 68. " Trap Door.                       | 95. " Main Draft-spring.             |
| 57. " Platform-lever Plate.     | 69. " Platform Lever.                  | 96. " Auxiliary Draft-spring.        |
| 58. " Platform-lever Jaw.       | 72. Tender-coupler Catch-spring.       | 97. Combination Lever-jaw Pin.       |
| 59. " Ball-joint Washer.        | 74. Tender Coupler.                    | 98. " Open Link for Miller Hook.     |
| 60. " Side-spring Washer.       | 75. Tender-coupler Buffer (Flat Face). | 99. " Follower.                      |
| 61. " Swivel.                   | 76. " " (Round Face).                  | 100. " Follower-guide.               |
| 62. " Swivel-hook.              | 80. Janney Knuckle (Old Style).        | 101. " Side-spring Plate Washer.     |
| 63. " Side-spring Trigger.      | 86. Freight Coupler.                   | 102. Buffer, Round Face (Old Style). |
| 64. " Connecting-pin.           | 89. " Draft-bolt.                      | 103. " Flat Face.                    |
| 65. " Trap-door Spring.         | 92. " Coupler-pin.                     |                                      |
| 66. " Eye-bolt for Miller Hook. | 93. " Coupler-pin Washer.              |                                      |

(The reference numbers are the same as used in the makers' lists.)

(Draw-gear of the Manhattan Elevated Railroads of New York is shown in Figs. 166-167.)

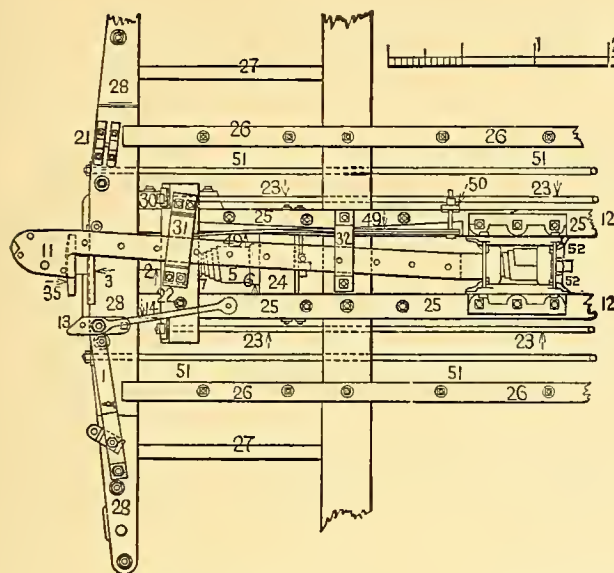


Fig. 636. Inverted Plan.

MILLER COUPLER-BUFFER AND PLATFORM

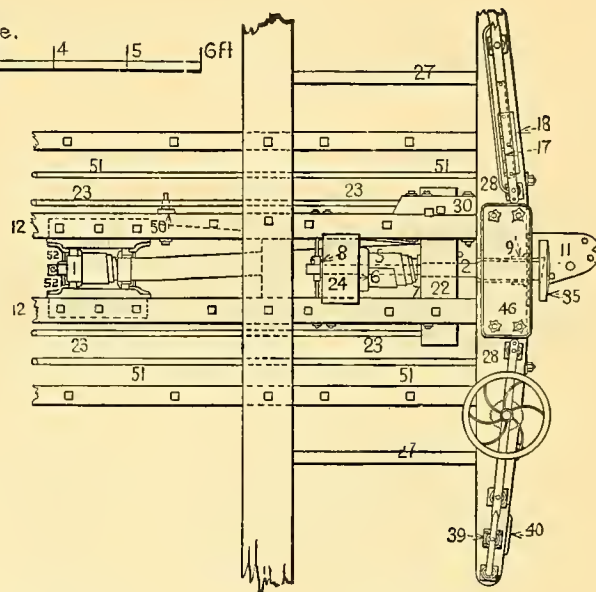


Fig. 637. Plan.

NAMES OF PARTS OF MILLER COUPLER AND PLATFORM; Figs. 636-643.

- |                             |                               |                               |                                     |
|-----------------------------|-------------------------------|-------------------------------|-------------------------------------|
| 1. Brake-shaft Brace.       | 15. Uncoupling-lever.         | 26. Platform Timbers.         | 40. Coupling-pin Chafing-plate.     |
| 2. Buffer-bar.              | 16. Uncoupling-chain.         | 27. Platform Sills.           | 41. Coupling-pin Chain.             |
| 3. Buffer-plate.            | 17. Uncoupling-lever Ratchet. | 28. Platform End-timber.      | 42. Coupling-pin Chain-eye.         |
| 4. Buffer-spring.           | 18. Uncoupling-lever Plate.   | 29. Suspender-beam.           | 44. Brake-shaft Thimble.            |
| 5. Buffer-spring Cup.       | 19. Uncoupling-lever Wedge.   | 30. Stirrup-block.            | 46. Inscription-plate.              |
| 6. Buffer-spring Washer.    | 20. Wedge-chain.              | 31. Drawbar Carry iron.       | 48. Drawbar Chafing-plate.          |
| 7. Buffer-stem Washer.      | 21. Trunnion-plates.          | 32. Inner Drawbar Carry-iron. | 49. Coupling-spring or Leaf-spring. |
| 8. Buffer-thimble.          | 22. Platform Truss-beam.      | 35. Buffer-head.              | 50. Coupling-spring Bracket.        |
| 9. Drawbar Coupling-hook.   | 23. Platform Truss-rod.       | 36. Buffer-shank.             | 51. Platform Tie rods.              |
| 10. Centre-sills.           | 24. Buffer-spring Beam.       | 37. Buffer-stem.              | 52. Side Lugs.                      |
| 11. Stop for Coupling-hook. | 25. Drawbar Timber.           | 39. Coupling-pin Plate.       |                                     |
| 12. Stop-brace.             |                               |                               |                                     |

Numbers refer to List of Names of Parts on preceding page.

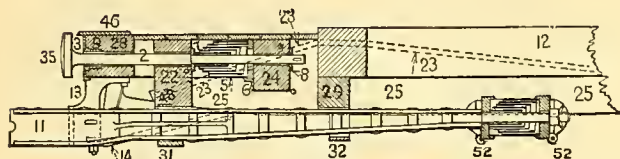


Fig. 638. Longitudinal Section.

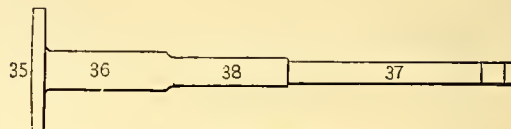


Fig. 639.  
BUFFER-BAR.

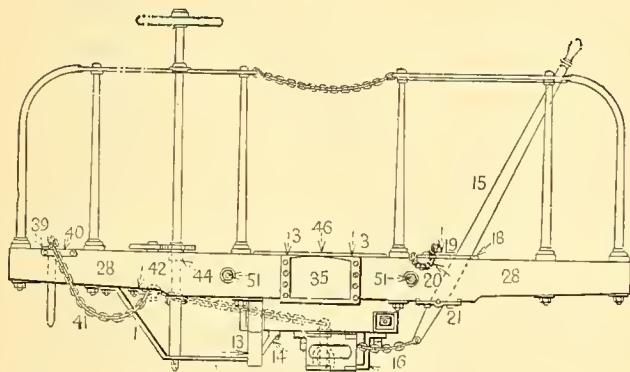


Fig. 640. End View.

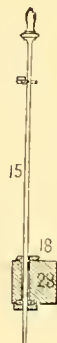


Fig. 641.

UNCOUPLING-LEVER.

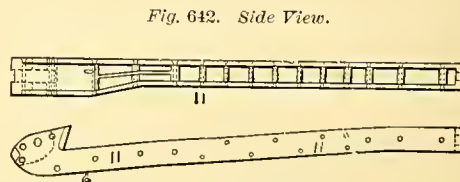


Fig. 642. Side View.

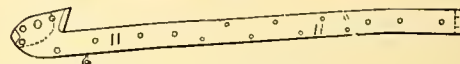


Fig. 643. Plan.  
DRAW-BAR COUPLING-HOOK.

MILLER COUPLER-BUFFER AND PLATFORM.



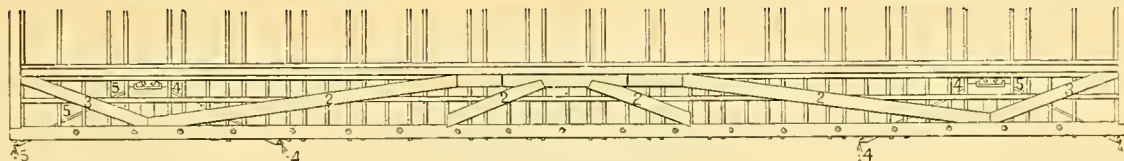


Fig. 644. Side View.

PORTION OF THE SIDE-FRAME OF A PASSENGER CAR, showing—1, COMPRESSION-BEAM; 2, COMPRESSION-BEAM BRACE; 3, COUNTER-BRACE; 4, BODY BRACE-ROD; 5, BODY COUNTERBRACE ROD.



Fig. 645. Side View.

PORTION OF THE SIDE-FRAME OF A PASSENGER CAR, showing—1, TRUSS-ARCH; 2, BODY-COUNTERBRACE.

(A different style of this general type of framing is shown with names of parts in Fig. 159; also, without reference numbers, in Fig. 199.)

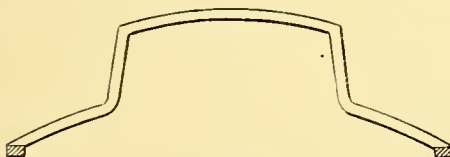


Fig. 646.

PROFILE CARLINE.



Fig. 647.

SECTION OF COMPOUND CARLINE.

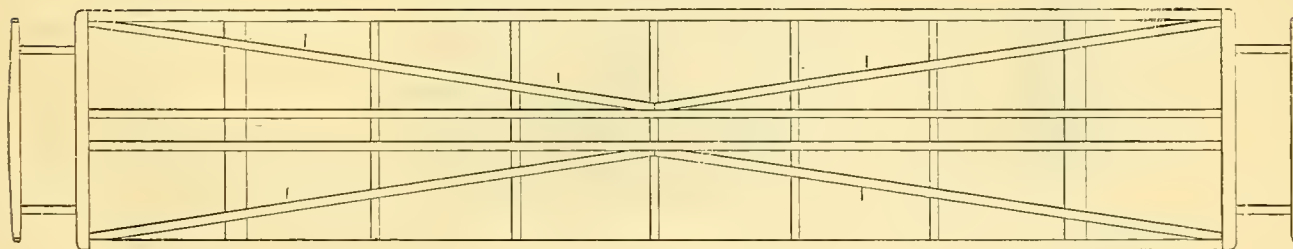


Fig. 648. Plan.

FLOOR FRAMING, showing—1, DIAGONAL FLOOR-TIMBER.

(Similar to Fig. 650, except that the carlines or rafters meet at a point at the centre of the clear-story roof or "upper deck." Such a roof is shown in Figs. 188-190.)

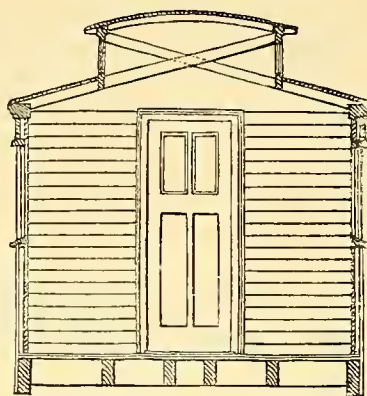


Fig. 649.  
"A" CAR ROOF.

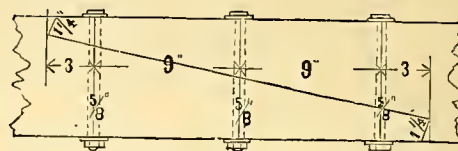


Fig. 651.

SHIP SPLICE OR SCARF JOINT.

Prescribed by Master Car-builders' Association as the Standard for repairing broken sills, as per following extract from "Rules for Interchange of Cars;":

"RULE 14.—Sills broken or materially injured must be replaced by new ones of the same size and of good quality, an exception to be made of intermediate and outside sills to which the draw timbers are not attached, which, if broken between bolster and end sill only, may be spliced with a 'ship splice,' as here shown, of 24 inches in length, and secured by three 5/8-inch bolts, all to be done in a workmanlike manner."

Fig. 650.  
X CAR ROOF.  
Transverse Section.

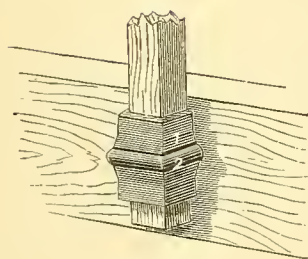


Fig. 652.  
STAKE-POCKET.

1. Stake-pocket.
2. Stake-pocket U-bolt.

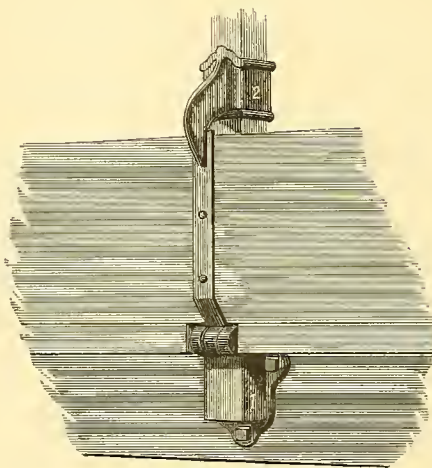


Fig. 653.  
STAKE-SLEEVE.

1. Stake-pocket.
2. Stake-sleeve.

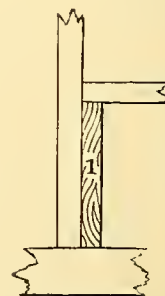


Fig. 654.  
1. Pilaster.

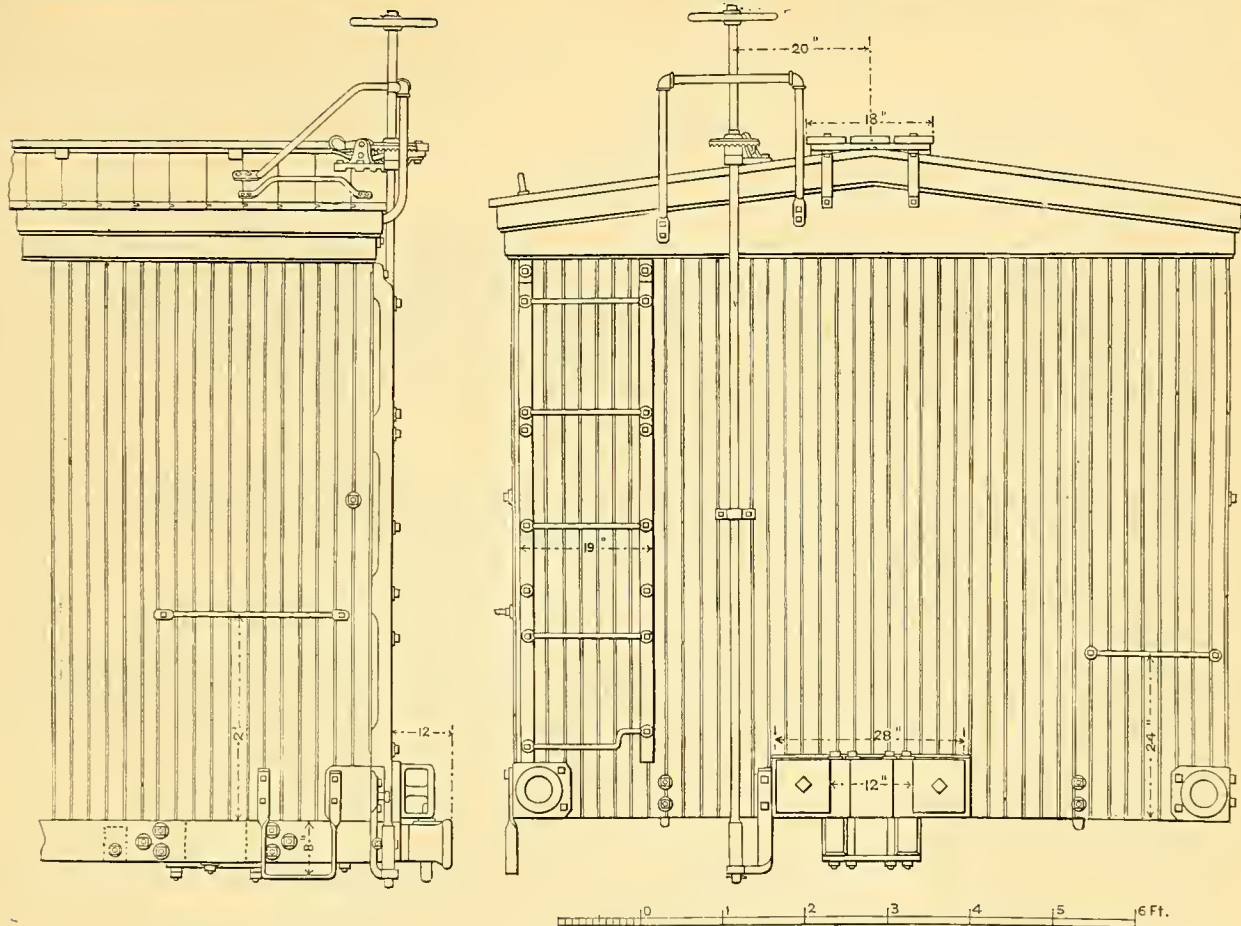


Fig. 656. Side View.

Fig. 657. End View.

STANDARD (except as noted\*) LADDER AND GRAB-IRON ATTACHMENTS recommended by M. C. B. Association, at 13th Annual Convention, Chicago, 1879.

It was specifically recommended,

- (1) "That all brake-shafts be placed on the left-hand corner of the car, when a person is standing on the track facing the end of the car," as in Fig. 657.
- (2) "That the small platform (brake-step) placed at one end of freight cars, to fasten the brake-pawl, etc. (100, Figs. 82, 84, 132, 136), be discontinued, the ratchet-wheel and pawl to be fastened to a suitable casting on the roof."
- (3) "That the running-boards be not less than 18 in. wide and 1 in. thick, the ends to project  $5\frac{1}{2}$  in. outside of the boarding, the projections to be supported by two braces made of 2 in. by  $1\frac{1}{4}$  in. iron."
- (4) "That two good substantial steps (sill-steps), made of wrought-iron  $\frac{1}{2}$  by  $1\frac{3}{4}$  in., be fastened, one to each side-sill, at diagonal corners of the car."
- (5) "That each box and stock car have two ladders, not less than five steps in each ladder, made of  $5\frac{1}{4}$ -in. round iron, projecting  $3\frac{1}{2}$  in. from the siding, securely fastened to each end at diagonal corners, with a handle directly over the ladders, on the roof."
- (6) "That the lower step of the ladder have a guard or projection in order to prevent men slipping when swinging around the end of the car to get on the step."

\* The grab-irons or handles shown are in the position recommended by a committee whose report was "received," but no other action was taken; also, the dimensions given in Fig. 657 for distance apart of dead-blocks have been increased 2 in. each. See Fig. 417.



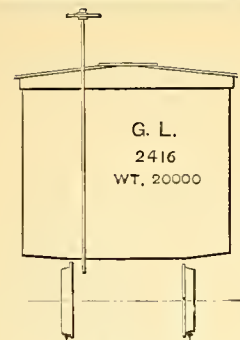
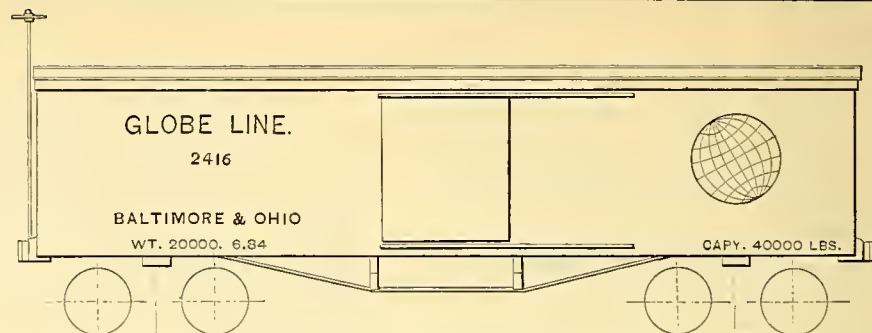


Fig. 658.



CARS IN FAST FREIGHT LINE SERVICE.

Fig. 659 M. C. B. STANDARD LETTERING.

The two following plans, Figs. 660-663, for lettering cars in ordinary service were submitted to letter-ballot, pursuant to vote of Convention, 1884, and were **not** adopted, for lack of the necessary two-thirds majority.

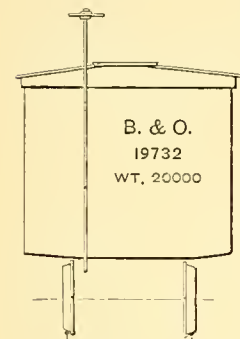
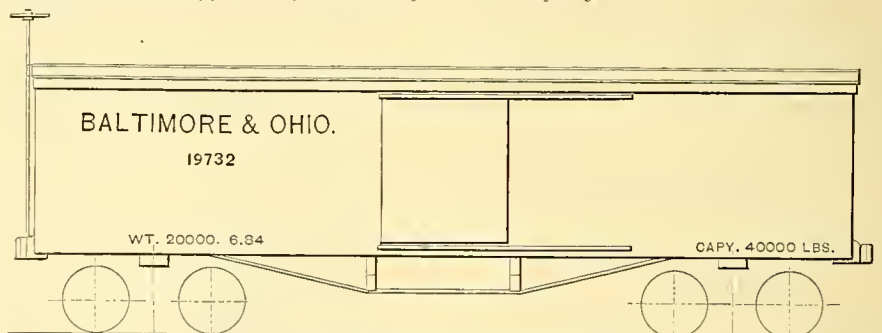


Fig. 660.



CARS IN ORDINARY SERVICE.

PREFERRED PLAN.

Fig. 661. Not a standard.

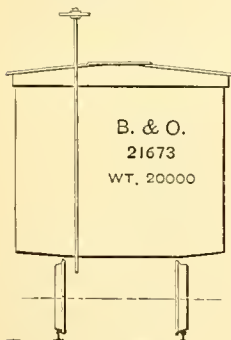
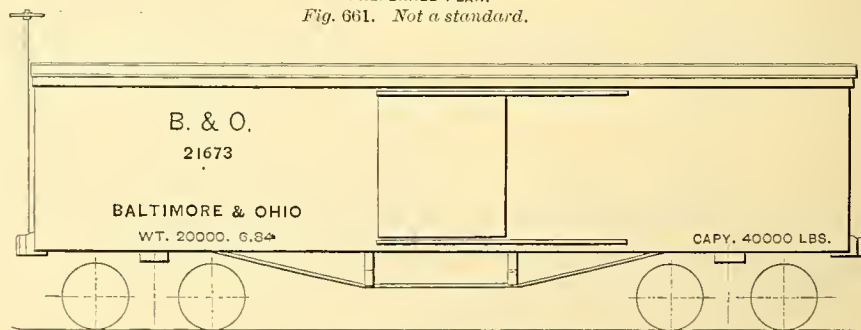


Fig. 662.



CARS IN ORDINARY SERVICE.

ALTERNATIVE PLAN.

Fig. 663. Not a standard.

M. C. B. STANDARD SYSTEM OF LETTERING LINE CARS. (See LETTERING in Dictionary.)

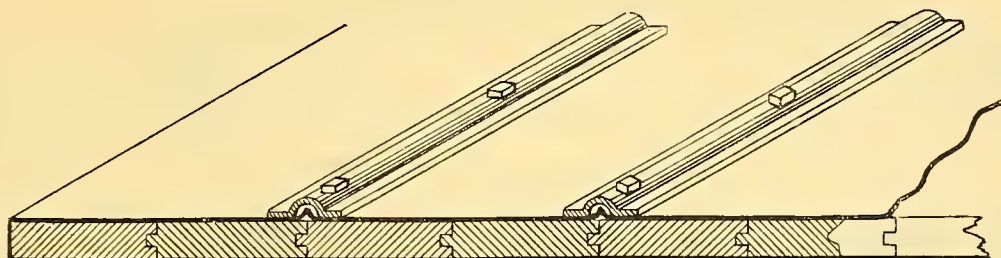


Fig. 664. SINGLE-BOARD CAR ROOF.

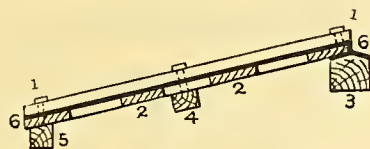


Fig. 665. Section.

SINGLE-BOARD CAR ROOF.

1. Roof Cover-strip.
2. Roof-sheets.
3. Ridge-pole.

4. Purlin.
5. Plate.
6. Roof-boards.

(Several other varieties of roofs, not shown by illustrations, consist of one or two thicknesses of boards, with or without some form of dove-tail connection, with painted canvas, or other similar water-proofing material. See CAR-ROOF in Dictionary.)

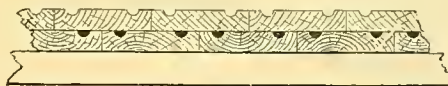


Fig. 666. Section.

DOUBLE-BOARD CAR-ROOF.

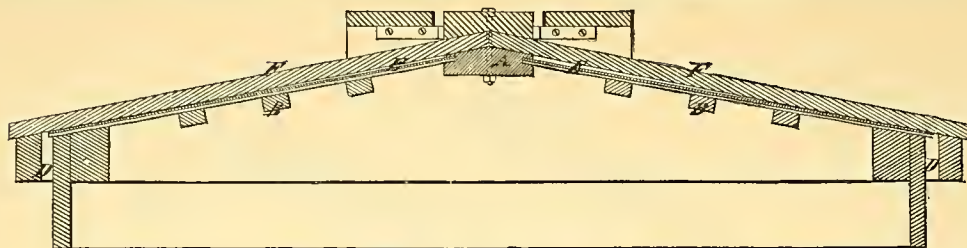


Fig. 667.  
End Section of Roof.

NAMES OF PARTS ;  
Figs. 667-668.

- A. Ridge-pole (grooved to receive metal sheets.)
- B. Purlins.
- C. Carlins.
- D. Overhang.
- E. Roof-sheets.
- F. Roof-boards.

(The grab-iron shown in this cut is not attached according to the best practice. See Figs. 656-657.)

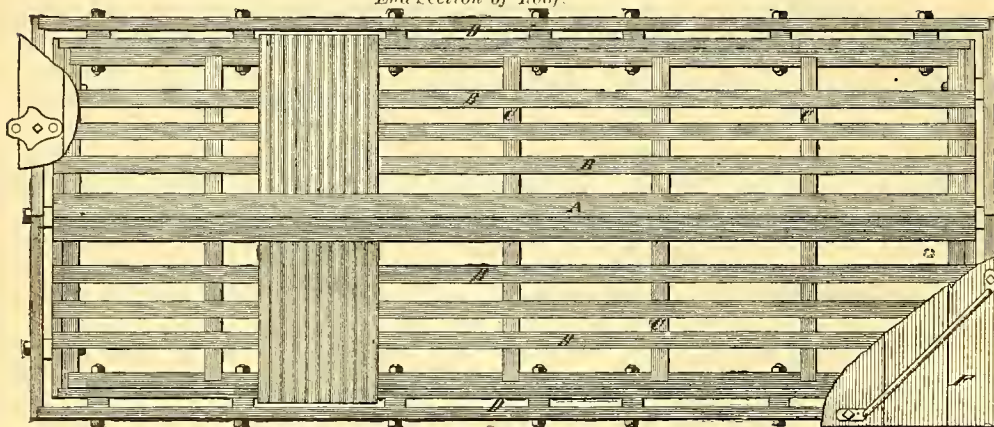
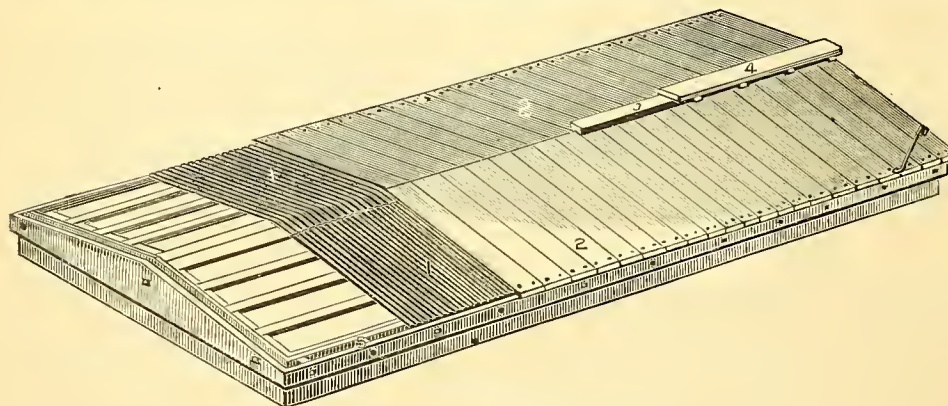


Fig. 668.  
Skeleton View of Roof Frame.



NAMES OF PARTS ; Fig. 669.

- 1. Roof-sheets (Corrugated Metal).
- 2. Roof-board.
- 3. Ridge Clamp.
- 4. Running-board.
- 5. Overhang.

Fig. 669.  
EMPIRE CORRUGATED-METAL CAR ROOF



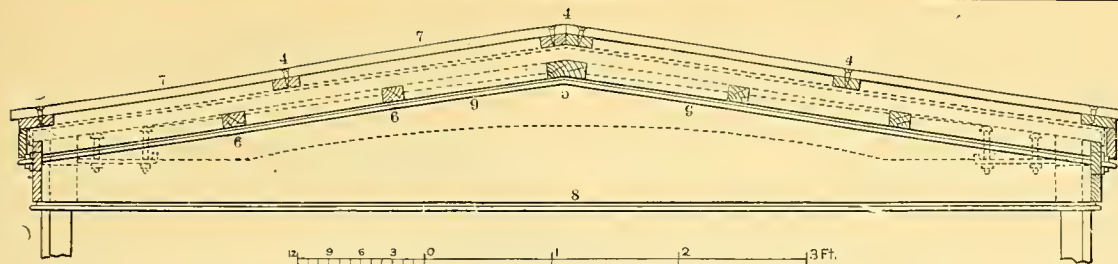


Fig. 670. Transverse Section.

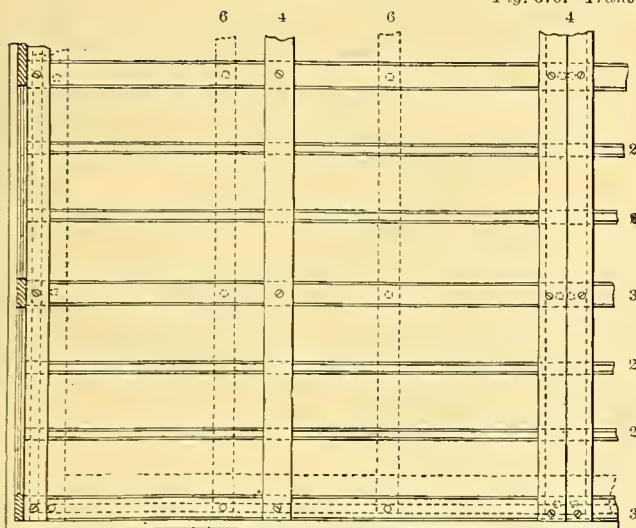


Fig. 671. Plan.

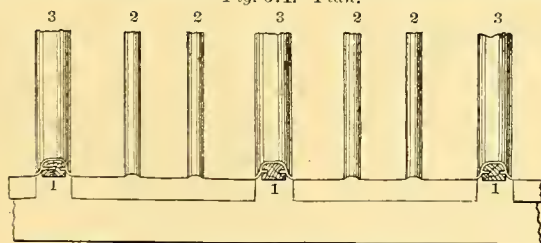


Fig. 672 Longitudinal Section.

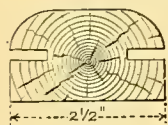


Fig. 672 1/2. SECTION OF JOINT STRIP.

## NAMES OF PARTS; Figs. 670-672 1/2.

1. Joint-strip.
2. Corrugations.
3. Cover-strip.
4. Roof-strips.
5. Ridge-pole.
6. Purlins.
7. Roof-boards.
8. Eaves Fascia-board.
9. Carline.

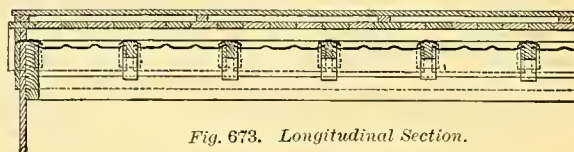


Fig. 673. Longitudinal Section.

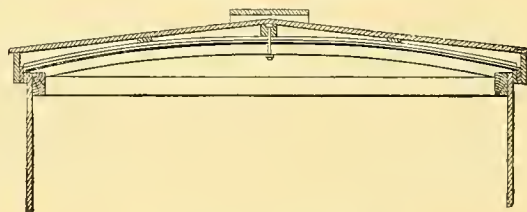


Fig. 674. Transverse Section.

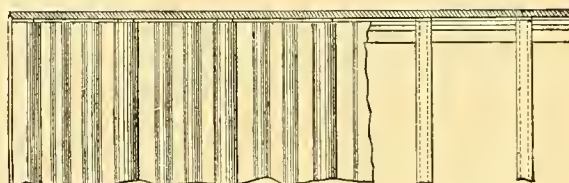


Fig. 675. Plan.

## WINSLOW CAR ROOF.

(With flat roof-sheets; the most recent and common standard.)

WINSLOW CAR-ROOF. (With curved roof-sheets.)

## SLEEPING BERTHS.

NAMES OF PARTS OF SLEEPING CARS; Figs. 676-681.

- |                            |                                |
|----------------------------|--------------------------------|
| 1. Lower Berth.            | 11. Berth Safety-rope.         |
| 2. Upper Berth.            | 12. Berth-latch.               |
| 3. Upper Berth, folded up. | 12. Berth-latch Handle.        |
| 4. Berth-brace.            | 13. Berth-curtain.             |
| 5. Berth-brace Eye.        | 14. Berth Curtain-rod.         |
| 6. Berth-chain.            | 15. Berth Curtain-rod Bracket. |
| 7. Berth-chain Pulley.     | 16. Head-board.                |
| 8. Berth-spring.           | 17. Head-board Bolt.           |
| 9. Berth-spring Frame.     | 18. Hat-post.                  |
| 10. Berth-spring Rope.     |                                |

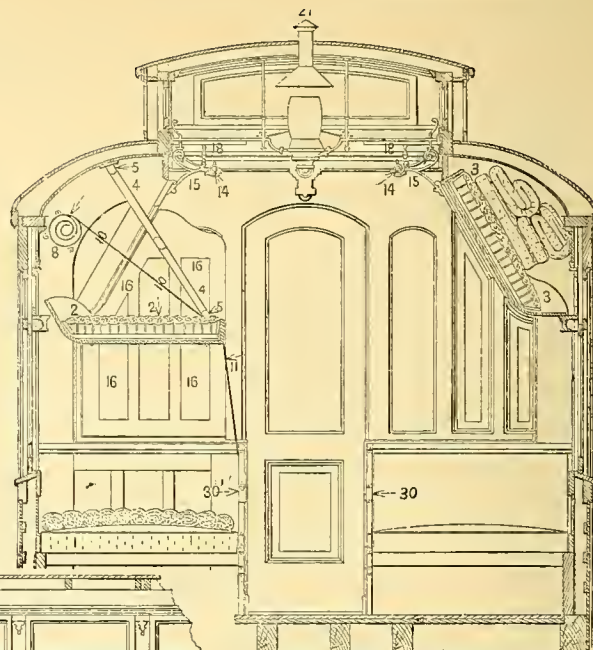
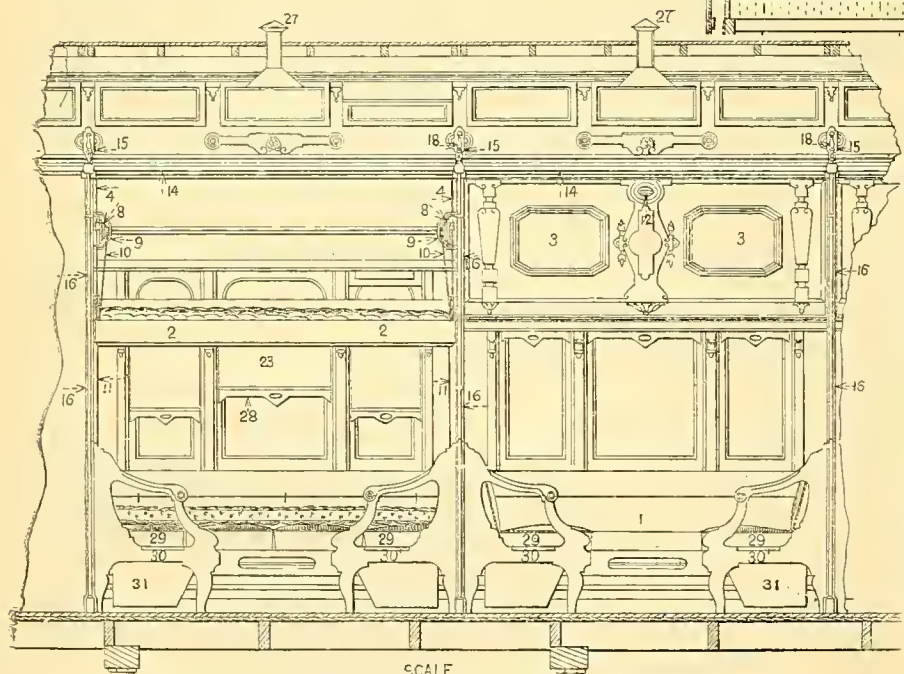


Fig. 676. SECTION OF SLEEPING CAR, showing Berths down and folded up.

NAMES OF PARTS Continued.

- |  |
|--|
| 19. Table-hook.                        |
| 20. Table-hook Plate.                  |
| 21. Sash Lift.                         |
| 22. Sash Lock.                         |
| 23. Window Shade, also Window Curtain. |
| 24. Inside Window-panel.               |
| 25. Ticket holder (obsolete).          |
| 26. Arm-rest.                          |
| 27. Lamp jack.                         |
| 28. Window-shade Leather.              |
| 29. Seat.                              |
| 30. Right-hand Seat-end.               |
| 30'. Left hand Seat end.               |
| 31. Pillow-box.                        |
| 32. Head-board Pocket.                 |
| 33. Upper-berth Pocket.                |



Berths down.

SCALE

Berths folded up.

Fig. 677. LONGITUDINAL SECTION OF SLEEPING CAR, showing two sections.



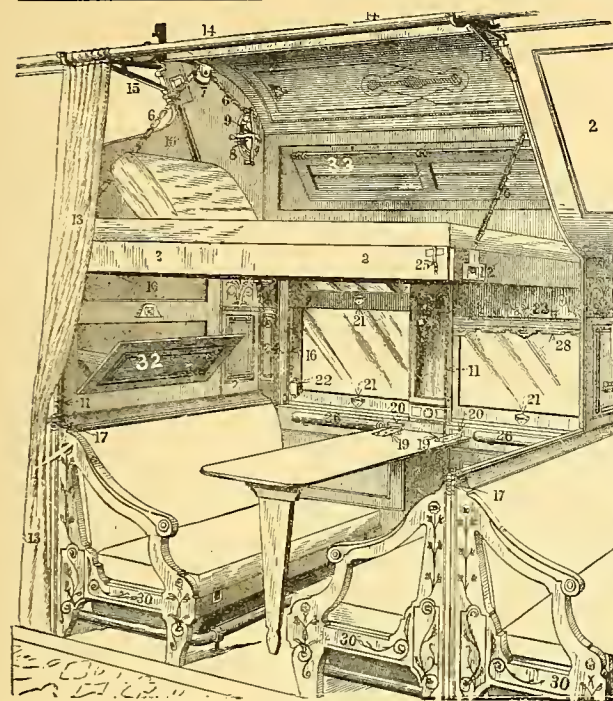


Fig. 678.

PERSPECTIVE VIEW OF SECTION OF A SLEEPING-CAR.

(Names of Parts on previous page.)

NAMES OF PARTS; Fig. 679.

- 3. Upper Berth, folded up.
- 13. Berth-curtain.
- 14. Berth Curtain-rod.
- 21. Bar Sash-lift.
- 27'. Window-shade Leather.
- 30. Right-hand Seat-end.
- 30'. Left-hand Seat-end.
- 40. Table.
- 42. Berth Safety-latch Handle.

NOTE.—Figs. 676-678 do not correctly represent the more modern style of interior finish, the general style of which is more correctly shown in Fig. 679. The triple windows of Fig. 677 are now unusual, preference being given to the arrangement shown in Figs. 678-9, except that the buffet or sideboard and looped curtains are special to private cars. The BERTH-SPRING, 8, is now often concealed behind boarding at the side of the car and the BERTH SAFETY-ROPE dispensed with by use of BERTH SAFETY-LATCHES, Figs. 1261-1264.

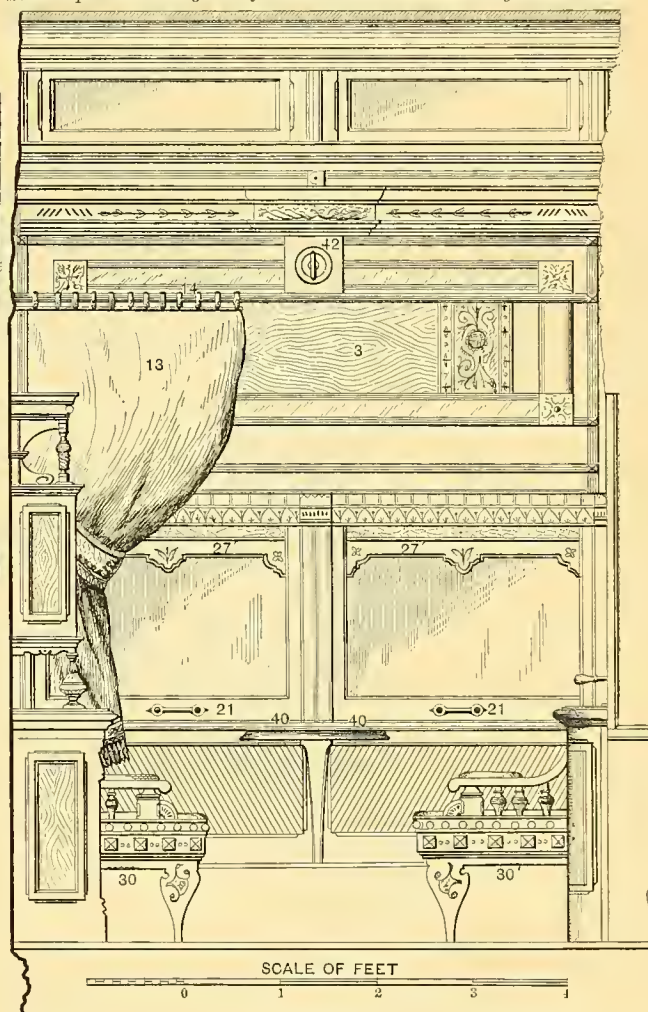


Fig. 679.

SLEEPING-CAR BERTH for private car of PITTSBURGH, CLEVELAND & TOLEDO RAILROAD. ("QUEEN ANNE" style of interior finish.)

(Floor-plan of car shown in Fig. 211.)



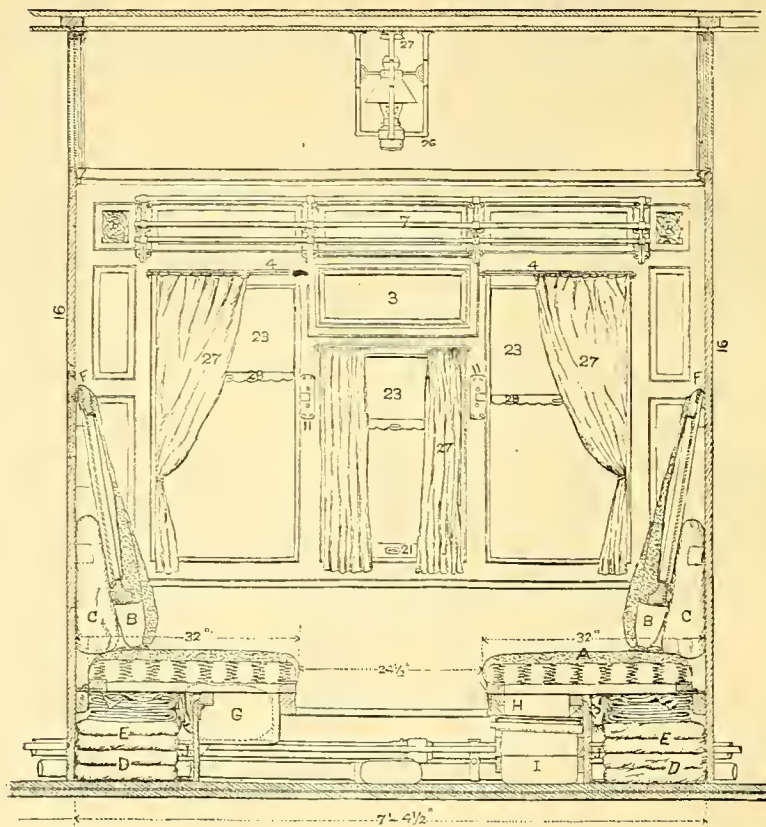


Fig. 680.

MANN BOUDOIR SLEEPING CARS.

(Sectional View of a FOUR-PLACE BOUDOIR arranged for day use.)

(These cars are shown in plan in Figs. 212-213 and in  
outside appearance in Fig. 46.)

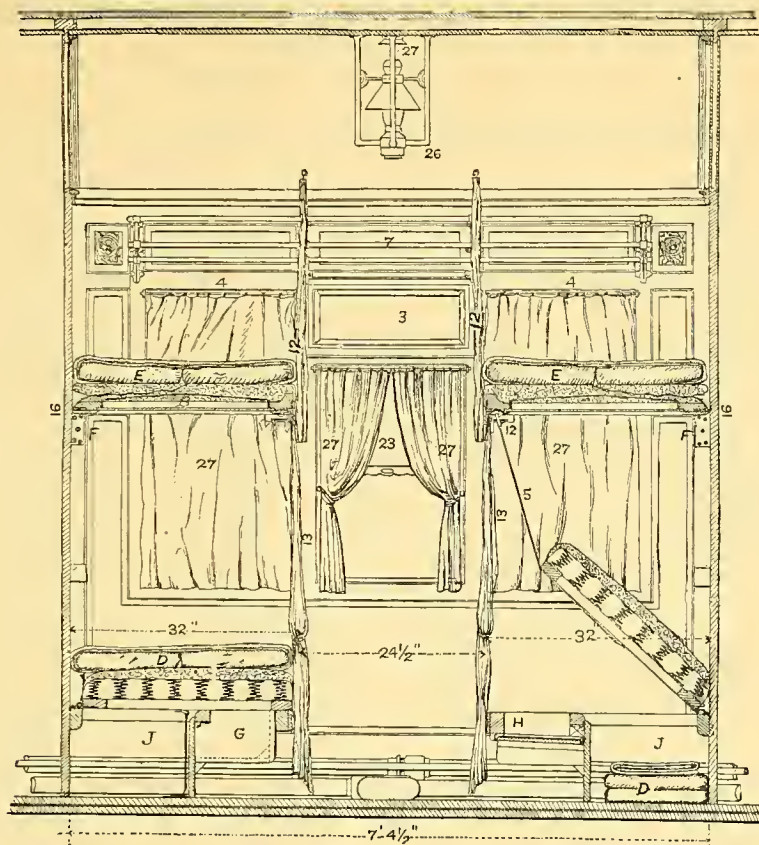


Fig. 681.

Sectional view of a FOUR-PLACE BOUDOIR in process of conversion into a sleeping room.

MANN BOUDOIR SLEEPING CAR.

NAMES OF PARTS OF MANN BOUDOIR SLEEPING BERTHS; Figs. 680-681.

- |                               |   |  |
|-------------------------------|---|--|
| A. Sofa.                      | 3. Mirror-panel.                                      | 14. Upper Berth-rest.                  |
| B. Sofa-back and Upper Berth. | 4. Curtain-rods.                                      | 16. Partition-wall.                    |
| C. Bolsters.                  | 5. Seat-cord.   | 21. Sash Lift.                         |
| D. Lower-berth Mattress.      | 7. Basket Rack, with Exhaust Ventilators at each end. | 23. Window Shades.                     |
| E. Upper-berth Mattress.      | 11. Upper Berth-rest Plate.                           | 26. Lamp Arms.                         |
| F. Upper Berth-lunge.         | 12. Upper Berth-rest and Upper Berth-curtains.        | 27. Smoke-bell for Lamp.               |
| G. Pillow-box.                | 13. Lower Berth-curtains.                             | 27. Window Curtains (Side and Centre). |
| H. Step-ladder Box.           |   | 28. Window-shade Leathers.             |
| J. Mattress box.              |   |  |

## EMIGRANT SLEEPING BERTHS.

NAMES OF PARTS, EMIGRANT SLEEPING BERTHS :

*Figs. 682-685.*

- A. Bracket Berth-hinge.
- B. Seat-back Corner.
- H. Berth-catch.
- K. Berth-rest Plate.
- L. Upper Berth-rest.
- M. Berth-rest (double).
- N. Single or End Berth-rest.
- O. Stop-bar.
- R. Stop-bar Hinge.
- S. Stop-bar Plate.

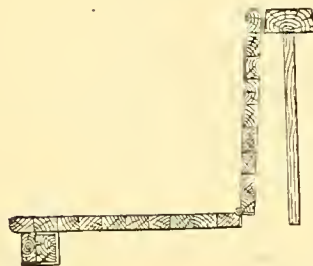


Fig. 682. Section of Seat, at O P, Fig. 684.

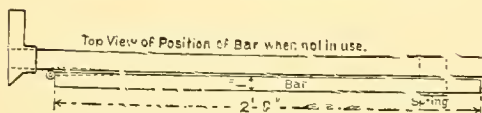


Fig. 683. Stop-bar Details.

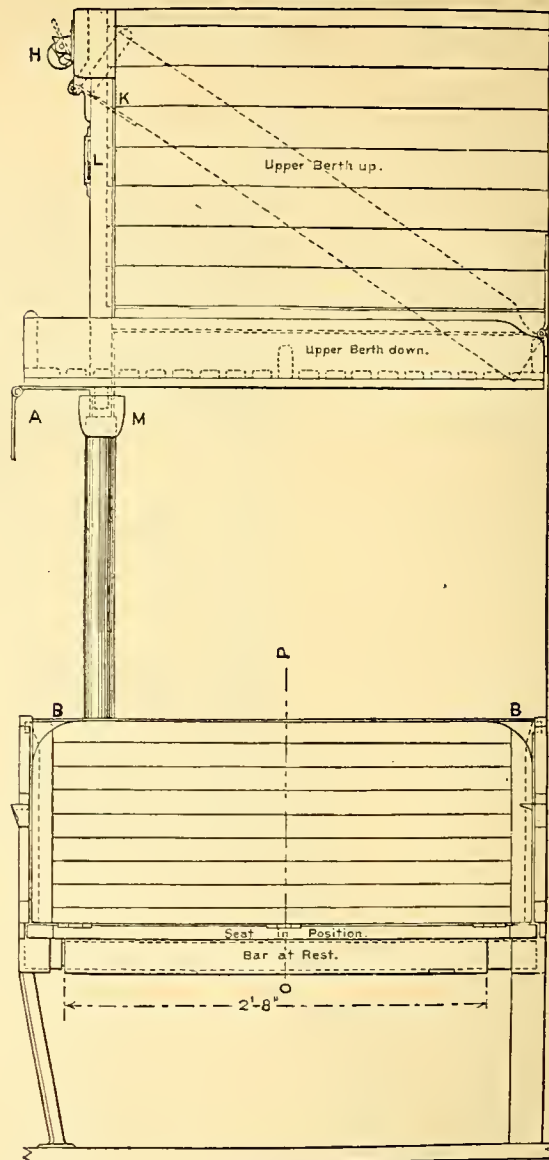


Fig. 684. Front View.

SLEEPING BERTH FOR EMIGRANT CAR, UNION PACIFIC RAILROAD.



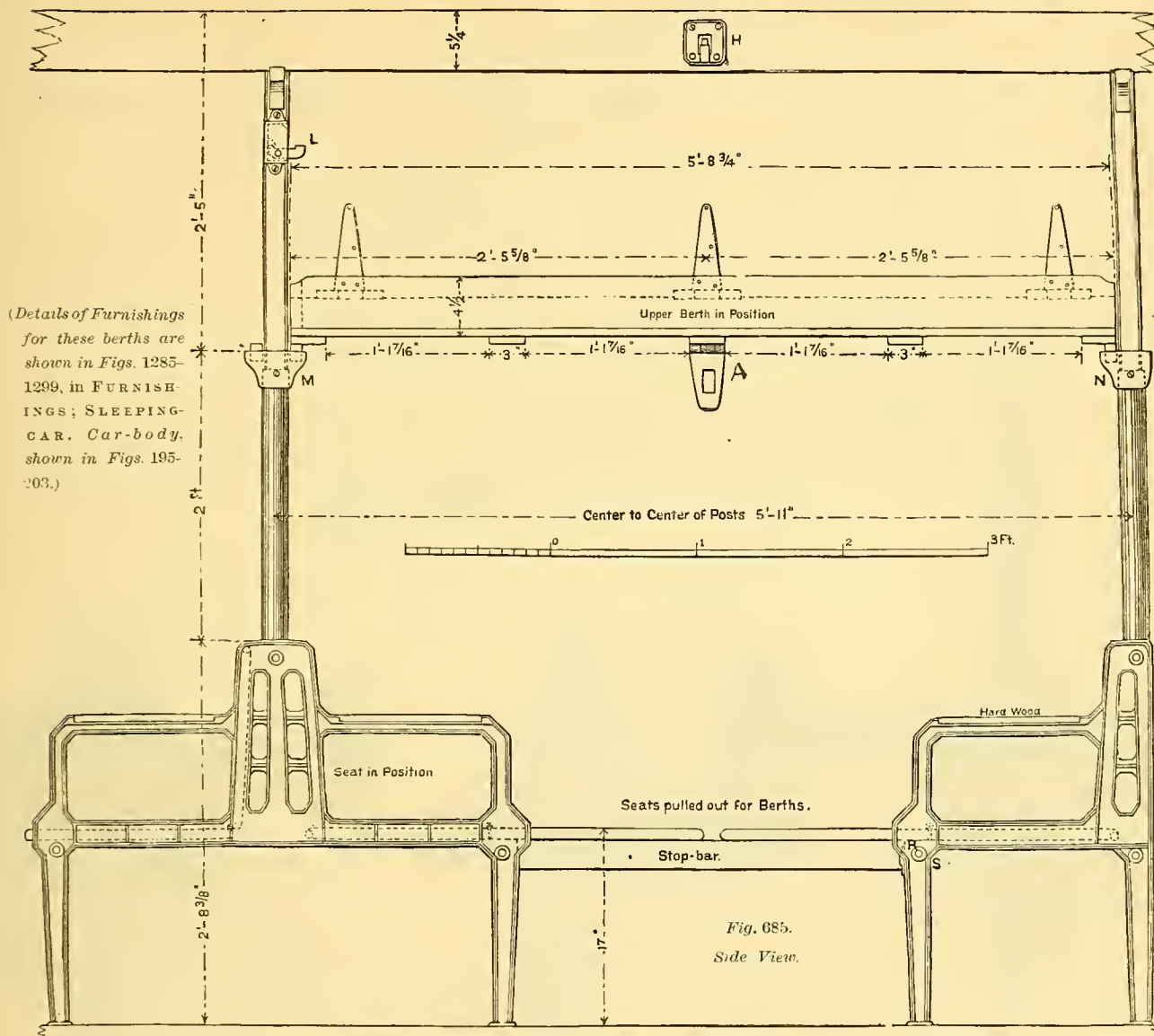


Fig. 685.  
Side View.

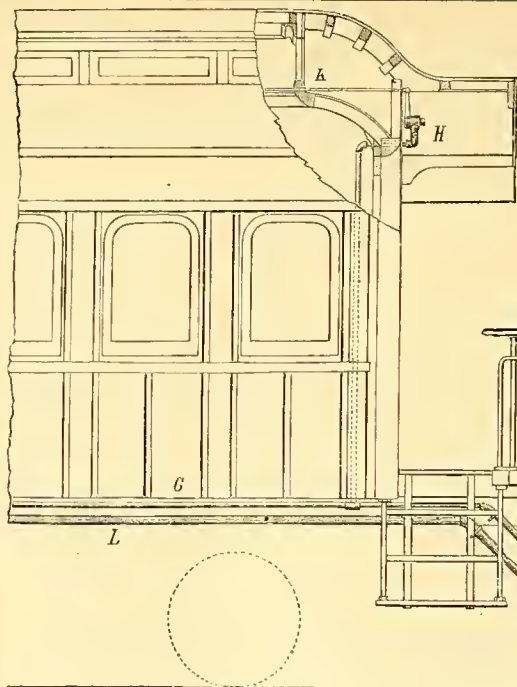


Fig. 687. WESTINGHOUSE TRAIN SIGNALING.

(Also shown applied to cor, in plan, in Fig. 686.)

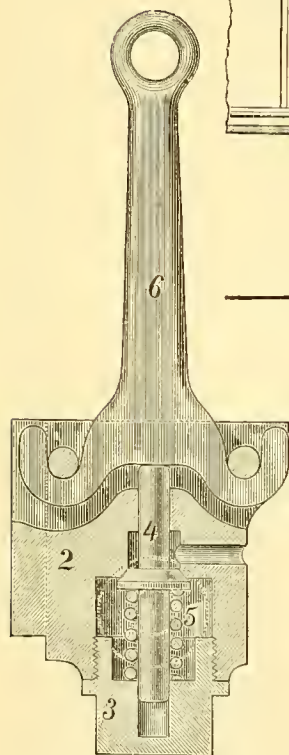


Fig. 688. CAR SIGNAL-VALVE.  
(Placed at H, Fig. 687.)

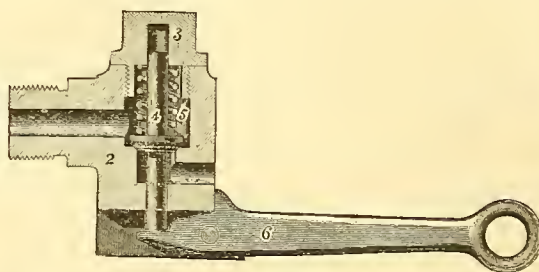


Fig. 689.  
CAR SIGNAL VALVE.  
(Old style; abandoned in favor of Fig. 688.)

NAMES OF PARTS; Figs. 688-689.

- |                           |                    |
|---------------------------|--------------------|
| 2. Car Signal-valve Body. | 5. Discharge-valve |
| 3. Cap-nut.               | Spring.            |
| 4. Discharge-valve.       | 6. Cord-lever.     |

(Fig. 688 is an improved design, standing vertical instead of horizontal, and operating when the lever is moved either way, so as to enable a continuous cord to be used.)

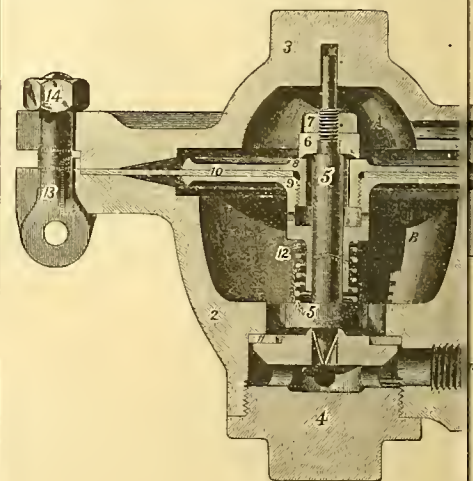
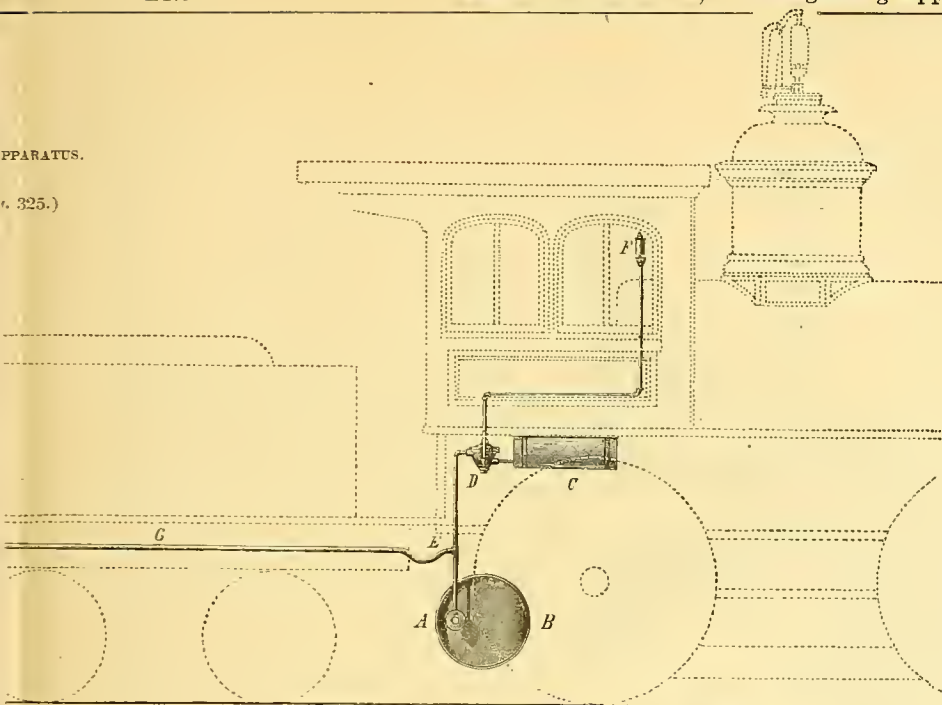


Fig. 690. SIGNAL-VALVE (for Engine).  
(Placed at D, Fig. 687.)

PPARATUS.

r. 325.)



## NAMES OF PARTS IN GENERAL VIEW

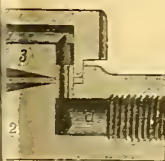
Fig. 687.

- A. Reducing Valve.
- B. Main Reservoir.
- C. Signal Reservoir.
- D. Signal Valve.
- E. Signal-pipe Coupling.
- F. Signal Whistle.
- G. Signal-pipe.
- H. Car Signal-valve.
- K. Signal or Bell-cord.
- L. Brake-pipe.

## NAMES OF PARTS; Fig. 690.

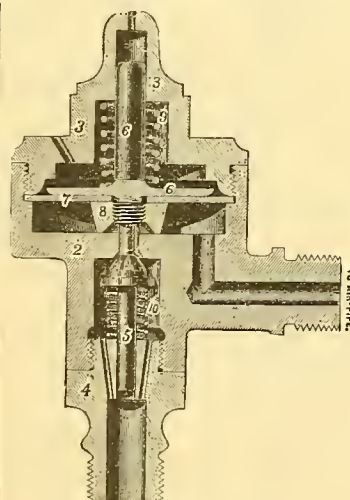
- 2. Lower Diaphragm-case.
- 3. Upper Diaphragm-case.
- 4. Lower-cap Nut.
- 5. Valve and Valve-stem.
- 6. Feed-valve.
- 7. Feed-valve Nut.
- 8. Upper Diaphragm-plate.
- 9. Lower Diaphragm-plate.
- 10. Diaphragm.
- 11. Rubber Gasket.
- 12. Diaphragm Spring.
- 13. Eye-bolt.
- 14. Eye-bolt Nut.

(The reference numbers are the same as used in the makers' lists.)



TO MAIN PIPE

WHISTLE



TO SIGNALING RESERVOIR.

Fig. 691. REDUCING-VALVE.

## NAMES OF PARTS; Fig. 691.

- 2. Reducing-valve Body.
- 3. Upper Cap.
- 4. Lower Cap.
- 5. Supply-valve.
- 6. Diaphragm-plate.
- 7. Diaphragm.
- 8. Diaphragm Nut.
- 9. Diaphragm Spring.
- 10. Supply-valve Spring.



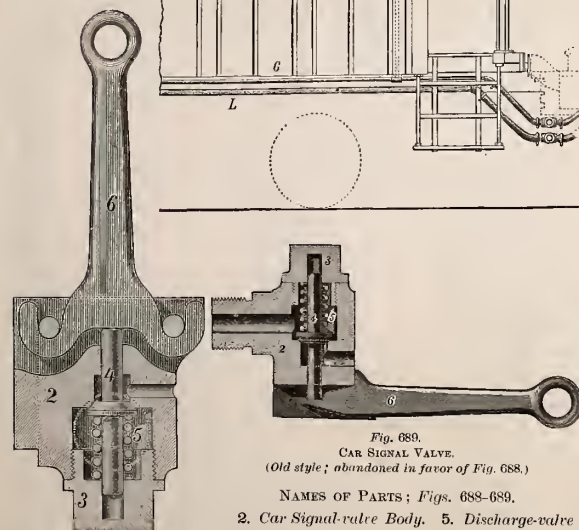


Fig. 687. WESTINGHOUSE TRAIN SIGNALING APPARATUS.

(Also shown applied to car, in plan, in Fig. 325.)

NAMES OF PARTS IN GENERAL VIEW  
Fig. 687.

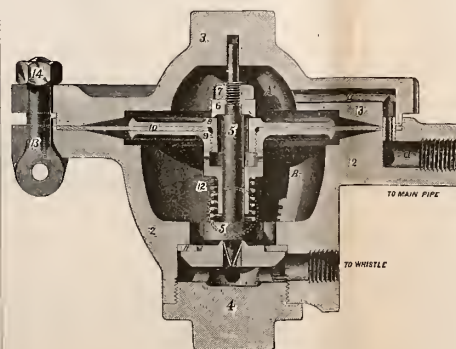
- A. Reducing Valve.
- B. Main Reservoir.
- C. Signal Reservoir.
- D. Signal Valve.
- E. Signal-pipe Coupling.
- F. Signal Whistle.
- G. Signal-pipe.
- H. Car Signal-valve.
- K. Signal or Bell-cord.
- L. Brake-pipe.



NAMES OF PARTS; Figs. 688-689.

- 2. Car Signal-valve Body.
- 3. Cap-nut.
- 4. Discharge-valve.
- 5. Discharge-valve Spring.
- 6. Cord-lever.

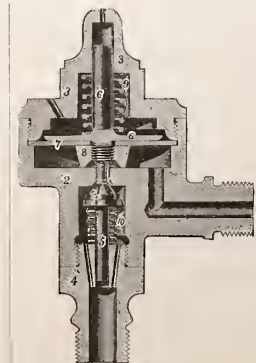
(Fig. 688 is an improved design, standing vertical instead of horizontal, and operating when the lever is moved either way, so as to enable a continuous cord to be used.)



NAMES OF PARTS; Fig. 690.

- 2. Lower Diaphragm-case.
- 3. Upper Diaphragm-case.
- 4. Lower-cap Nut.
- 5. Valve and Valve-stem.
- 6. Feed-valve.
- 7. Feed-valve Nut.
- 8. Upper Diaphragm-plate.
- 9. Lower Diaphragm-plate.
- 10. Diaphragm.
- 11. Rubber Gasket.
- 12. Diaphragm Spring.
- 13. Eye-bolt.
- 14. Eye-bolt Nut.

(The reference numbers are the same as used in the makers' lists.)



NAMES OF PARTS; Fig. 691.

- 2. Reducing-valve Body.
- 3. Upper Cap.
- 4. Lower Cap.
- 5. Supply-valve.
- 6. Diaphragm-plate.
- 7. Diaphragm.
- 8. Diaphragm Nut.
- 9. Diaphragm Spring.
- 10. Supply-valve Spring.

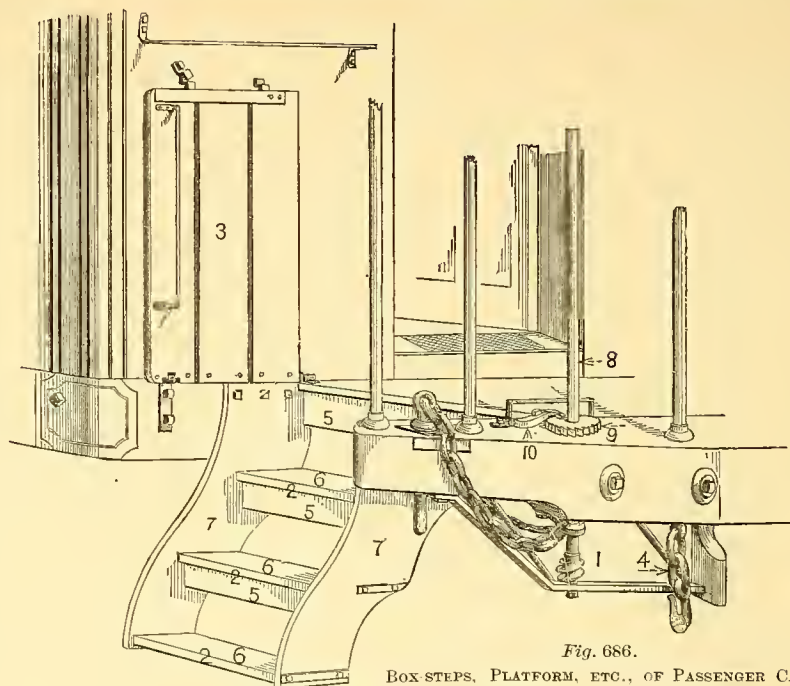


Fig. 686.

BOX STEPS, PLATFORM, ETC., OF PASSENGER CAR.  
Perspective View.

## PASSENGER-CAR STEPS.

(Transferred from page E178, where it properly belongs in its alphabetical order.)

NAMES OF PARTS OF PASSENGER-CAR STEPS, PLATFORM, ETC.: Fig. 244.

1. Brake-chain Worm.
2. Nosing of a stairs.
3. Platform Trap-door.\*
4. Safety Coupling-chain.
5. Step-riser.
6. Tread-board.
7. String-board.

\* The Platform Trap-door is rarely used except on officers' or other private cars. Other "platform trap-doors" are placed in the platform. See Dictionary.

8. Brake-shaft.
  9. Brake-Ratchet-wheel.
  10. Brake-pawl.
- Splash-board, not shown, covers up the entire back of the steps. See 49, Figs. 169-172.

(See also CAR-BODIES, PASSENGER. EXTENSIBLE CAR-STEPS, in which the lower steps can be readily raised or lowered for use, have been introduced, but are not in general use.)



## CAR WINDOWS.

*NOTE.*—The curved window-mouldings, 8, Fig. 692, and some of the details of Decoration, are not according to the most recent practice. See Fig. 679 and several cars in CAR-BODIES, PASSENGER, for more recent designs. The same is true of the Inside Window-panel, 35, Fig. 694, on the following page, and the Lambrequin, 28; Window-cornice, 34; and Window-shade, 27, in Fig. 695.

The furnishings shown attached in Figs. 692-695 are shown separately in FURNISHINGS; WINDOW, TABLE, SEATS, etc.

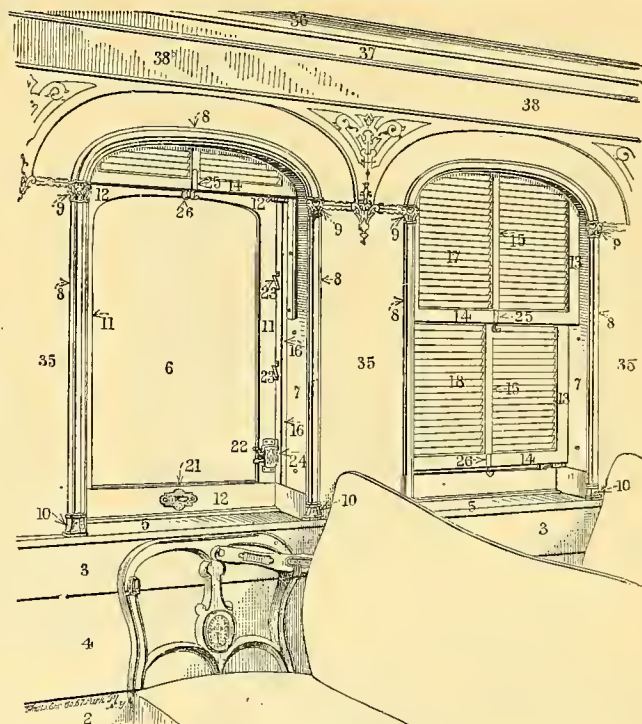


Fig. 692.

PERSPECTIVE VIEW OF PASSENGER-CAR WINDOWS.

### NAMES OF PARTS OF CAR WINDOWS; Fig. 692.

- |   |  |
|---|--|
| 3. Upper Wainscot-rail.                             | 17. Upper Window-blind, and Window-blind Slat. |
| 4. Wainscot-panel.                                  | 18. Lower Window-blind.                        |
| 5. Inside Window-sill.                              | 19. Window-blind Stop.                         |
| 6. Window, or Window-glass.                         | 21. Window-lift.                               |
| 7. Window-casing, or Inside Window-stop.            | 22. Window-latch.                              |
| 8. Window-moulding.                                 | 23. Window-latch Upper-stop.                   |
| 9. Window-moulding-joint Cover.                     | 24. Window-latch Lower-stop.                   |
| 10. Window-moulding Base.                           | 25. Upper Window-blind Lift.                   |
| 11. Window-stile.                                   | 26. Lower Window-blind Lift.                   |
| 12. Window-rail, Window-sash.                       | 35. Inside Window-panel.                       |
| 13. Window-blind Stile.                             | 36. Inside-cornice.                            |
| 14. Window-blind Rail.                              | 37. Inside-cornice Fascia-board.               |
| 15. Window-blind Mullion.                           | 38. Inside-cornice Sub-fascia-board.           |
| 16. Sash Parting-strip, Parting-bead, or Stop-bead. |  |

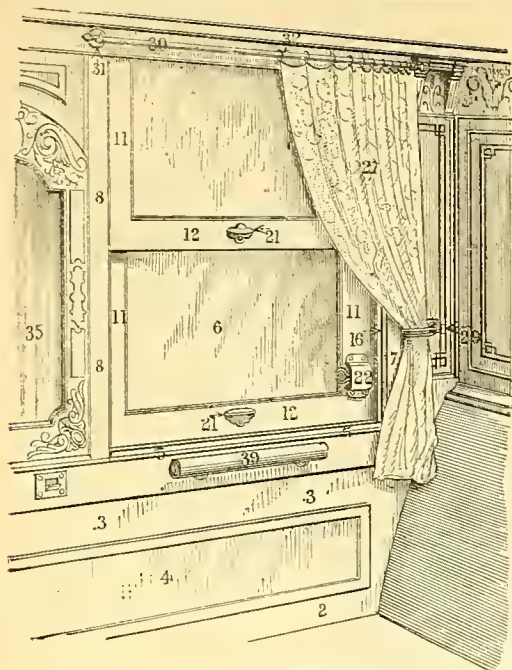


Fig. 694. PERSPECTIVE VIEW OF SLEEPING-CAR WINDOW

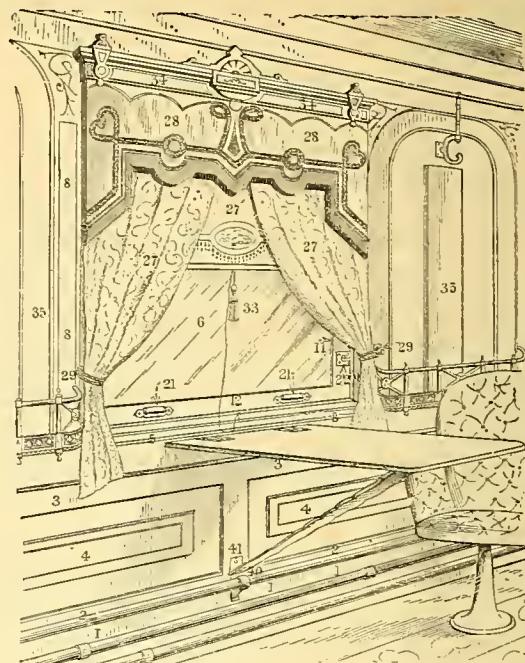


Fig. 695. PERSPECTIVE VIEW OF PARLOR-CAR WINDOW.

## NAMES OF PARTS OF CAR WINDOWS; Figs. 694-695.

- |   |                                       |
|---|---------------------------------------|
| 1. Truss-plank.                                     | 24. Window-latch Lower-stop.          |
| 2. Lower Wainscot-rail.                             | 27. Window-curtain.                   |
| 3. Upper Wainscot-rail.                             | 27'. Window-shade, or Window-curtain. |
| 4. Wainscot-panel.                                  | 28. Lambrequin.                       |
| 5. Inside Window-sill.                              | 29. Window-curtain Holder.            |
| 6. Window, or Window-glass.                         | 30. Window-curtain Rod.               |
| 7. Window-casing. or Inside Window-stop.            | 31. Window-curtain-rod Stanchion.     |
| 8. Window-moulding.                                 | 32. Curtain-rings.                    |
| 11. Window-stile.                                   | 33. Window-shade Tassel.              |
| 12. Window-rail, Window-sash.                       | 34. Window-cornice.                   |
| 16. Sash Parting-strip, Parting-bead, or Stop-bead. | 35. Inside Window-panel.              |
| 21. Window-lift.                                    | 39. Arm-rest.                         |
| 22. Window-latch.                                   | 40. Table-leg Hook.                   |
| 23. Window-latch Upper-stop.                        | 41. Table-leg-hook Plate.             |

(The furnishings shown attached to these engravings, as well as many others, are shown separately in FURNISHINGS; WINDOW, Figs. 1603 to 1707.)

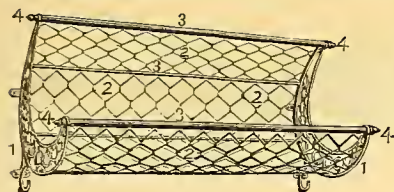


Fig. 696.

BASKET-RACK (old style).

1. Basket-rack Bracket.
2. Basket-rack Netting.
3. Basket-rack Rod.
4. Basket-rack T p, or Acorn.

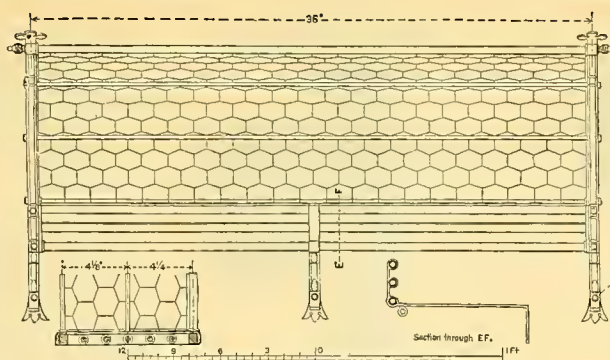


Fig. 697. Front Elevation, etc.

BASKET RACK, for Pennsylvania Railroad Standard Passenger Car.

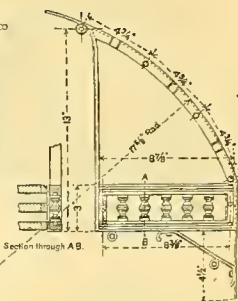


Fig. 697 1/2. End Elevation.

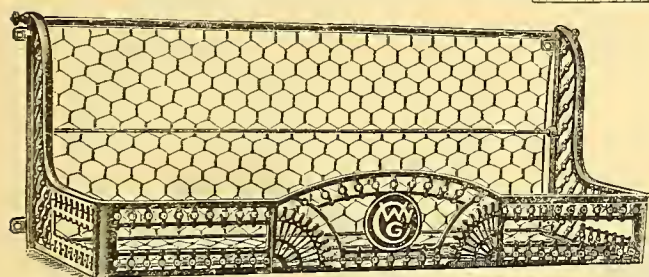


Fig. 698.

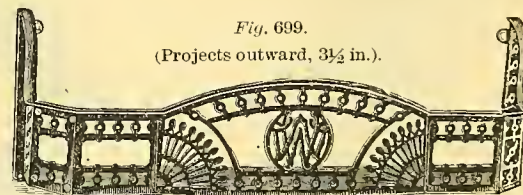
"MARLBOROUGH" BASKET-RACK, with Balustrade and brass netting  
(24 in. long).

Fig. 699.

(Projects outward, 3 1/2 in.).

PACKAGE-RACK for drawing-room cars).

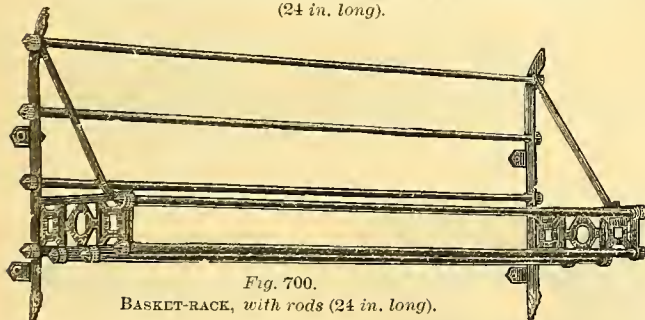


Fig. 700.

BASKET-RACK, with rods (24 in. long).

(Another style of BASKET-RACK of extra length, peculiar to the Mann Boudoir Cars, is shown in Figs. 680-681; also, a novel form of special design in the frontispiece to this volume.)

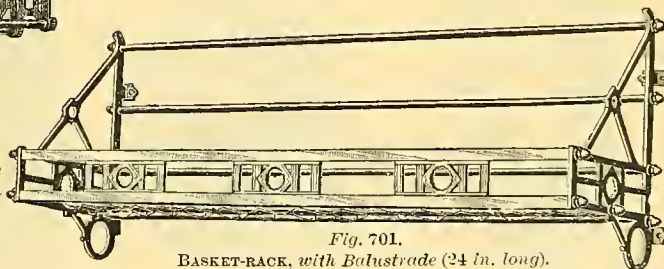


Fig. 701.

BASKET-RACK, with Balustrade (24 in. long).



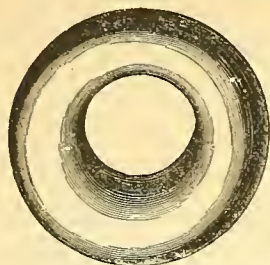


Fig. 702. BELL-CORD BUSHING.

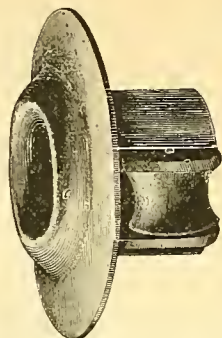


Fig. 703. BELL-CORD BUSHING, with Internal Pulley.



Fig. 709. SOLID-BRAIDED BELL-CORD.  
(Usual sizes,  $\frac{1}{4}$  in. and 9-32 in. diam.)



Fig. 710. BELL-CORD COUPLING.

(To attach the cord, the end is drawn through the coupling, and the screw inserted far enough to bury its head. The cord is then pulled back into place.)

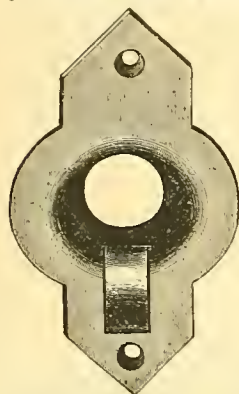


Fig. 704. BELL-CORD BUSHING, with Pulley.

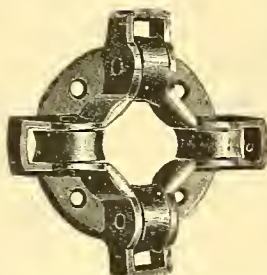


Fig. 705. QUARTETTE BELL-CORD BUSHING.

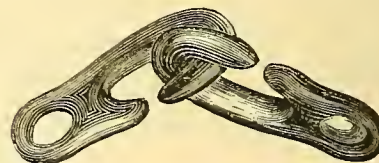


Fig. 711. BELL-CORD COUPLING.



Fig. 712. BELL-CORD COUPLING.



Fig. 706 BELL-CORD BEVELED BUSHING.

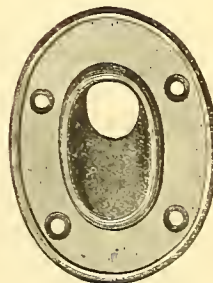


Fig. 707. BELL-CORD BEVELED BUSHING.

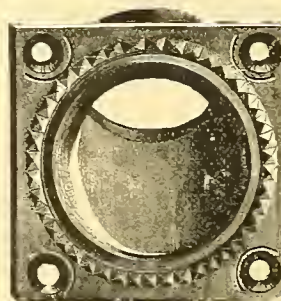


Fig. 708. BELL-CORD BEVELED BUSHING.



Fig. 713. BELL-CORD COUPLING.



Fig. 714. BELL-CORD COUPLING.  
(Usual sizes,  $\frac{3}{8}$  in. to 1 in. diam., varying by eighths, with 7-16 and 9-16.)

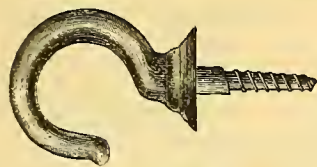


Fig. 715. BELL-CORD END-HOOK.

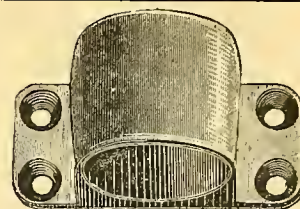
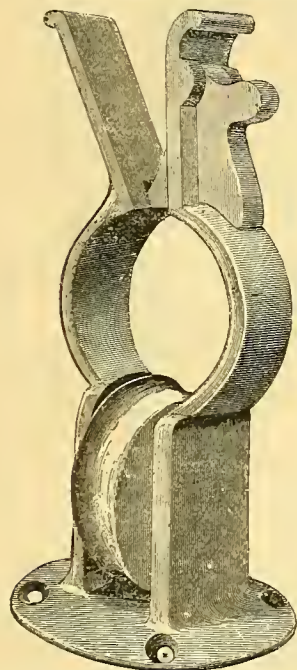
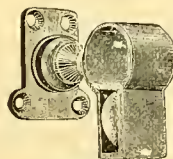
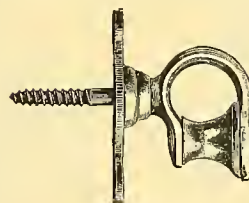
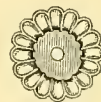
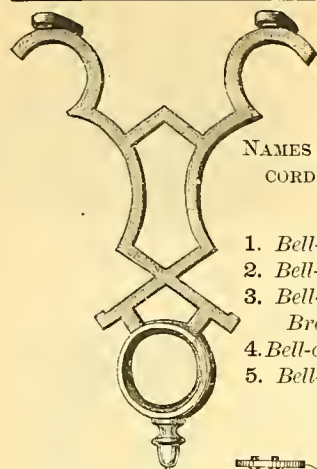
Fig. 717.  
BELL-CORD GUIDE,  
with Screw.Fig. 718.  
BELL-CORD GUIDE, with Flange.Fig. 719.  
BELL-CORD BUSHING.Fig. 716. FREIGHT-CAR BELL-CORD  
GUIDE.  
*Lignum-vitæ Sheave ( $\frac{3}{8}$  full size).*Fig. 720.  
BELL-CORD GUIDE, with Screw,  
Flange and Pulley.Fig. 721.  
BELL-CORD GUIDE, with  
Screw and Pulley.Fig. 722.  
BELL-CORD GUIDE, with  
Flange and Pulley.Fig. 723.  
BELL-CORD GUIDE, with  
Flange and Side-pulley.Fig. 724.  
BELL-CORD GUIDE, with Screw,  
Flange and Side-pulley.Fig. 725.  
BELL-CORD GUIDE, with Screw  
and Side-pulley.Fig. 726.  
BELL-CORD GUIDE,  
with two Pulleys.Fig. 727.  
BELL CORD GUIDE,  
with four Pulleys.Fig. 728.  
BELL-CORD GUIDE,  
with Centre-pulley.Fig. 729.  
BELL-CORD GUIDE WASHER.

Fig. 730.

Fig. 731.  
AIR BRAKE CORD GUIDE  
( $\frac{1}{4}$  full size).





NAMES OF PARTS OF BELL-CORD FIXTURES; Figs. 734-742.

1. Bell-cord Pulley.
2. Bell-cord Strap.
3. Bell-cord Strap-hanger-Bracket.
4. Bell-cord Guide.
5. Bell-cord Rod.

Fig. 732.  
BELL-CORD FIXED HANGER.  
(Standard sizes, 4½, 5½  
and 6 in. drop.)

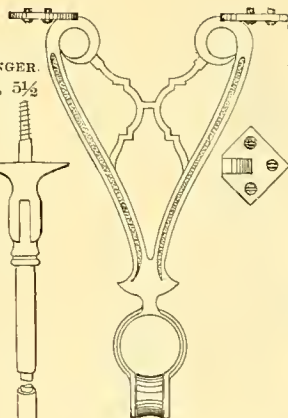


Fig. 733.  
BELL-CORD FIXED  
HANGER.  
(¼ full size.)

Fig. 738.



Fig. 739.  
BELL-CORD  
BUSHING.

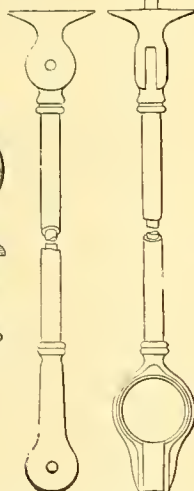
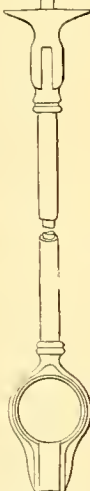


Fig. 740.  
BELL CORD ROD HANGER.



For Pennsylvania Railroad Standard Passenger  
Car, Figs. 178-185.  
(21" total drop to centre of pulley.)

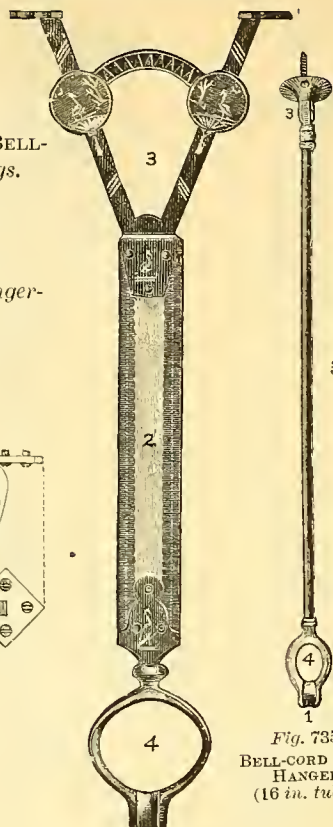


Fig. 734.  
BELL-CORD STRAP  
HANGER.



Fig. 743. BELL-CORD SPLICE.



Fig. 744. BELL-CORD SPLICE.



Fig. 745. BELL-CORD SPLICE.



Fig. 735.  
BELL-CORD ROD  
HANGER.  
(16 in. tube.)

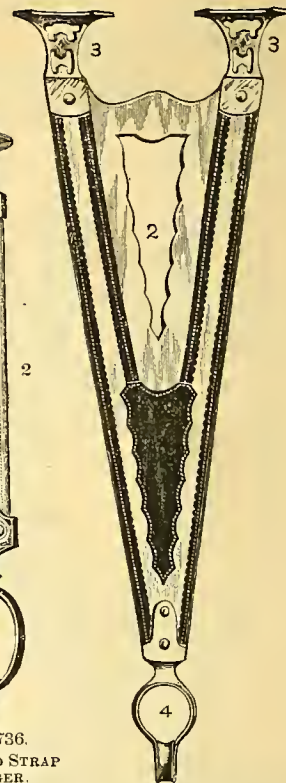


Fig. 736.  
BELL CORD STRAP  
HANGER.  
(8 in. strap.)

Fig. 737. 1  
BELL-CORD DOUBLE-STRAP HANGER.

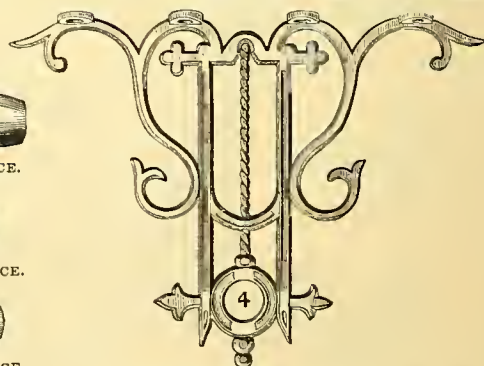


Fig. 742. BELL-CORD FIXED HANGER. (Old style.)





Fig. 746.  
SLIDING-DOOR LOCK, FLUSH HANDLE.  
( $3\frac{3}{8} \times 4\frac{1}{8}$  in.)

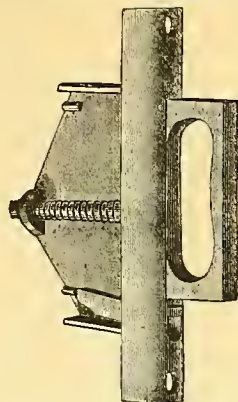


Fig. 747. SLIDING-DOOR PULL.  
(Round face,  $2\frac{7}{8} \times 4\frac{1}{2}$  in. Also made square face.)



Fig. 748.  
SLIDING-DOOR LOCK KEEPER.

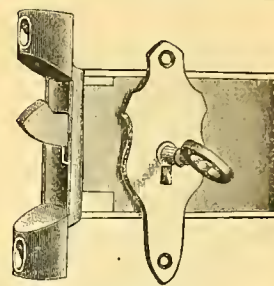


Fig. 749.  
SLIDING-DOOR LOCK.  
( $3\frac{3}{8} \times 3\frac{3}{4}$  in.)

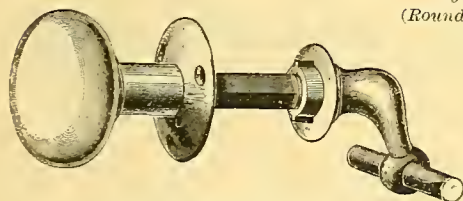


Fig. 750. T DOOR-KNOB,  
for Narrow-stile Doors.



Fig. 751.  
DOOR BUTTON.



Fig. 752.  
DOOR-PULL.  
Round Handle.)



Fig. 753.  
DOOR-PULL.  
(Flat Handle.)

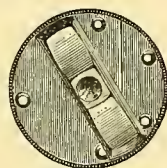


Fig. 754.  
DOOR-BUTTON AND PLATE.



Fig. 755.  
TORREY  
DOOR-SPRING.



Fig. 756.  
"BEE"  
DOOR-SPRING.



Fig. 757.  
"GEM"  
DOOR-SPRING.  
(26 to 39 in. long.) (26 to 39 in. long.)



Fig. 758.  
SQUARE DOOR-BOLT.



Fig. 759.  
SQUARE NECK DOOR-BOLT.



Fig. 760.  
BARREL DOOR-BOLT.  
1. Door-bolt Keeper.



Fig. 761.  
FLUSH DOOR-BOLT

(See also FURNISHINGS ; LOCKS.)

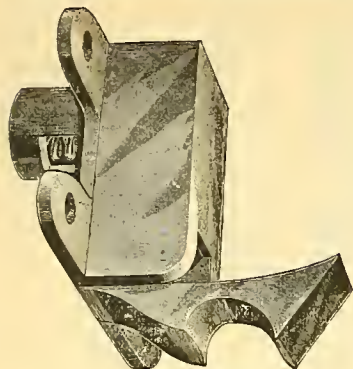


Fig. 762.  
DOOR-HOLDER.  
( $\frac{2}{3}$  full size.)



Fig. 763.  
DOOR-HOLDER PARTITION-STOP.  
( $\frac{2}{3}$  full size.)



Fig. 765.  
NOTICE-PLATE.  
Shown in position at 3, Fig. 370.)



Fig. 766.  
DOOR-SASH BOLT.

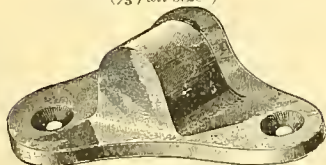


Fig. 764.  
DOOR HOLDER FLOOR-STOP.  
( $\frac{2}{3}$  full size.)



Fig. 772.  
DOOR-STOP.



Fig. 767.  
DOOR-SASH PLATE.



Fig. 768. Side View.



Fig. 770.

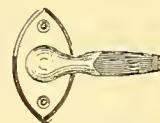


Fig. 773. Door-hook.



Fig. 774.  
DOOR-HOOK AND PLATE.



Fig. 775. Door-hook Plate.  
( $\frac{1}{4}$  full size.)



Fig. 769.  
SPRING DOOR-STOP. (Pennsylvania Railroad Standard.)  
(Mortise,  $5\frac{1}{2}$  in.  $\times$  1 11-16 in. deep  $\times$  1 in. wide.)

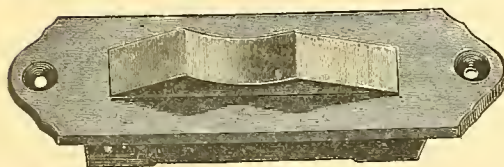


Fig. 771. SPRING DOOR-STOP.



Fig. 776. Door-holder.



Fig. 777. Spring Collar.  
BARNARD DOOR-HOLDER.

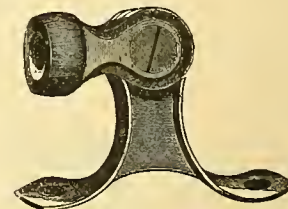


Fig. 778. Floor-stop.

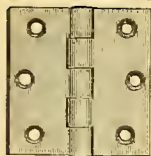


Fig. 779.  
FAST-JOINT BUTT-HINGE.

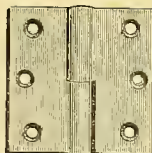


Fig. 780.  
LOOSE-JOINT BUTT-HINGE.

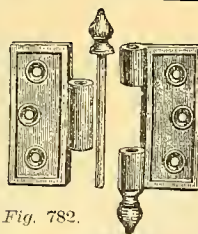


Fig. 782.  
LOOSE-PIN BUTT-HINGE.

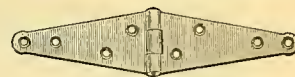


Fig. 783.  
STRAP-HINGE.

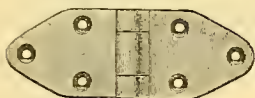


Fig. 781.  
HOPPER BUTT-HINGE.

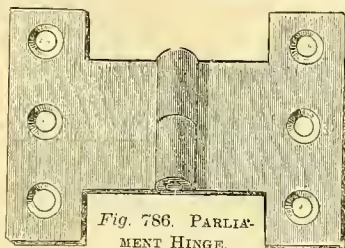


Fig. 786. PARLIAMENT HINGE.



Fig. 784.  
T-HINGE.

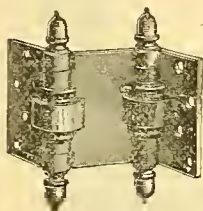


Fig. 785.  
DOUBLE-ACTING SPRING HINGE.  
(Height of flanges,  
 $2\frac{1}{2}$ " to 7".)

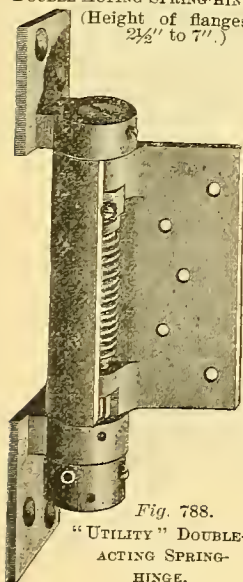


Fig. 788.  
"UTILITY" DOUBLE-ACTING SPRING-HINGE.

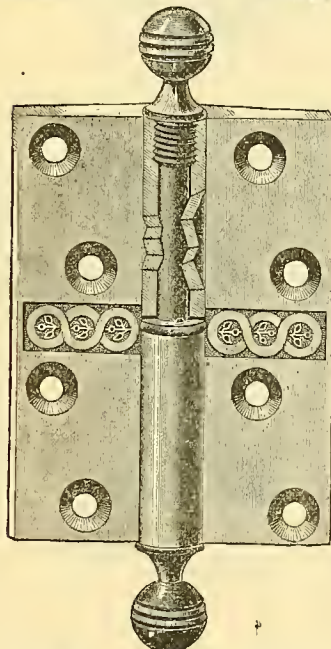


Fig. 789. ACORN BUTT-HINGE. (With  
KNUCKLE broken open, showing  
washer-bearing for HINGE PIN.)

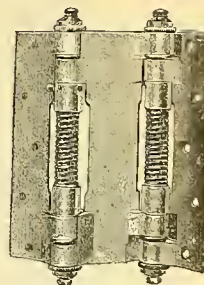


Fig. 787.  
DOUBLE-ACTING SPRING-HINGE.

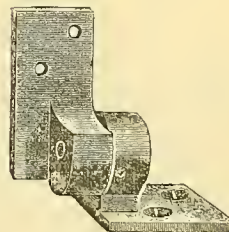


Fig. 790.  
BLANK HINGE.

(For use with double-acting spring-hinge. Also made with half-round flange.)



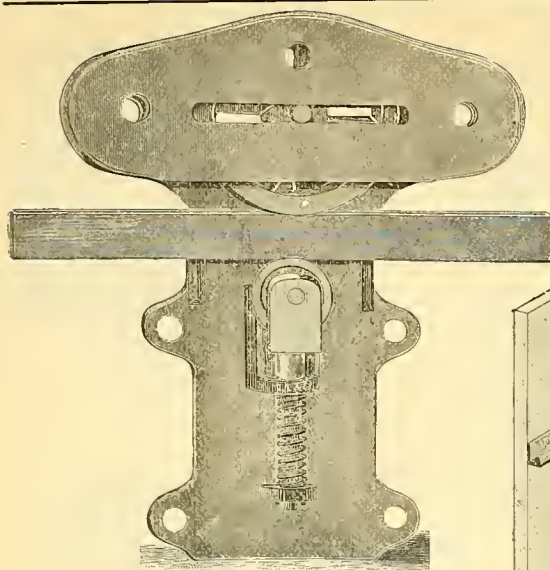


Fig. 791.  
HATFIELD HANGING-DOOR SHEAVE.  
(Used for both passenger and freight cars.)

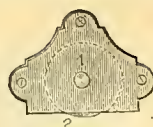


Fig. 792.  
DOOR-SHEAVE.  
(Simplest form.)  
1. Door sheave Holder.  
2. Door-sheave.

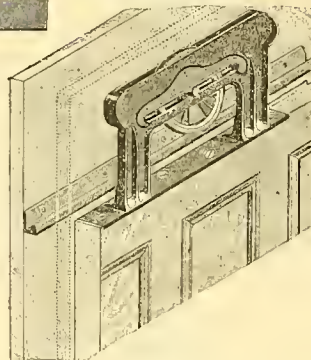


Fig. 793.  
"ANTI-FRICTION" CAR-DOOR SHEAVE.

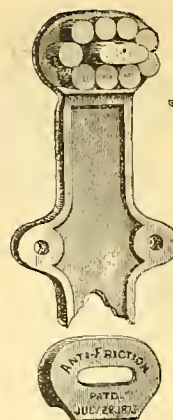


Fig. 794.  
Interior View,  
cover removed.  
"ANTI-FRICTION" CAR-DOOR HANGER.  
(With loose rollers.)

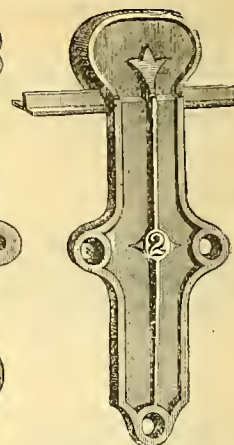


Fig. 795.  
Face View,  
in use.

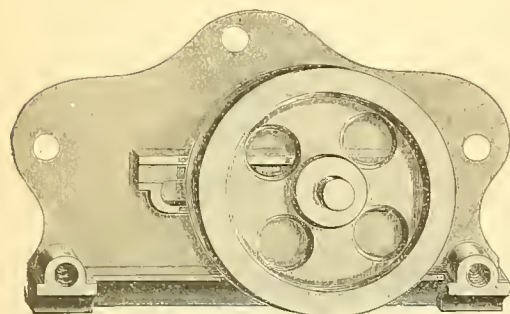


Fig. 796.  
Side Elevation, with one Side plate removed.  
"ANTI-FRICTION" CAR-DOOR SHEAVE.

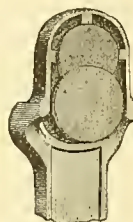


Fig. 798.



Fig. 799.

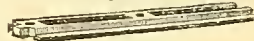


Fig. 800.

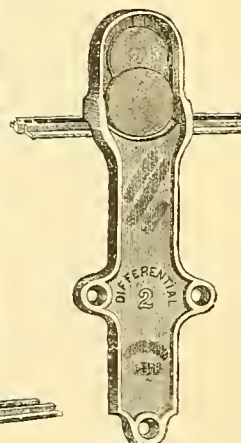


Fig. 801.

"DIFFERENTIAL" CAR-DOOR HANGER.  
(Sheaves, 4, 5 and 6 in.)  
(Another form of sliding door for sleeping-cars  
is shown in Figs. 371-372)

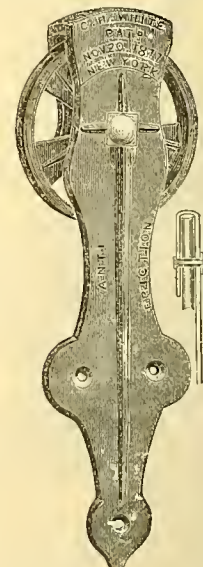


Fig. 797.  
WHITE'S "ANTI-FRICTION" CAR-DOOR HANGER.

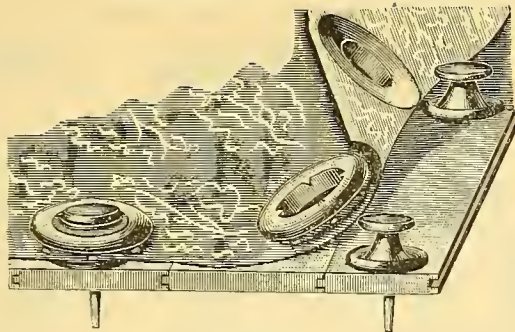


Fig. 802.  
CARPET EYELETS AND NAILS.

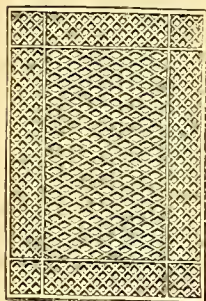


Fig. 806.  
PERFORATED-RUBBER FLOOR-  
MAT.  
( $\frac{1}{4}$  to  $\frac{5}{8}$  in. thick.)



Fig. 810.  
"PROTECTION" CUSPIDOR, with  
MAT.  
(Mat, 12 in. diameter.)

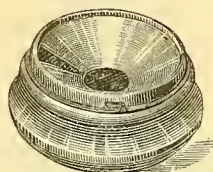


Fig. 808.  
SPITTOON.

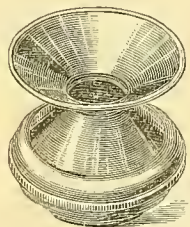


Fig. 809.  
CUSPIDOR.



Fig. 803.



Fig. 804.

UPPER AND LOWER GROMMETS FOR  
CARPET EYELETS.



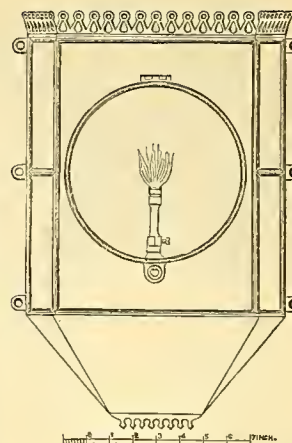
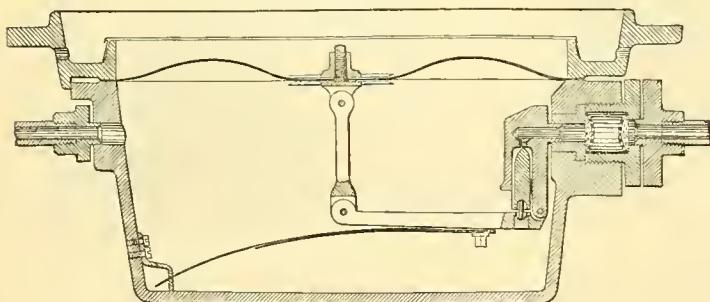
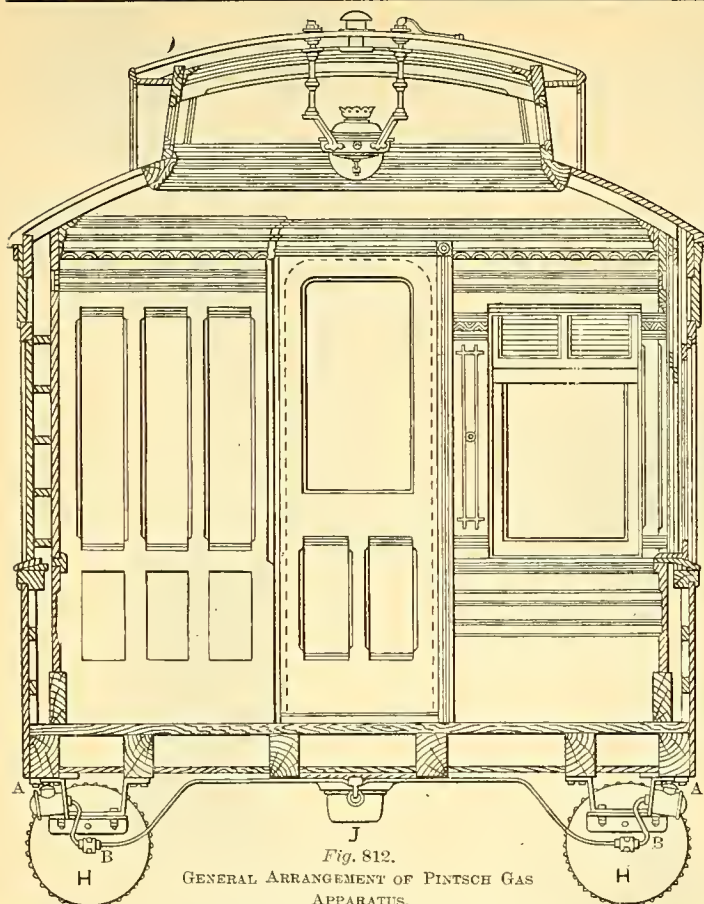
Fig. 805.  
WIRE EYELET-NAIL, with turned Knob.



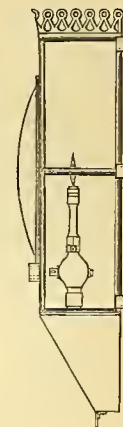
Fig. 807.  
CORRUGATED-RUBBER FLOOR-MAT.



Fig. 811.  
"PROTECTION" CUSPIDOR, with UM-  
BRELLA-RESTS.



SIDE-LIGHT, FOR SALOONS.

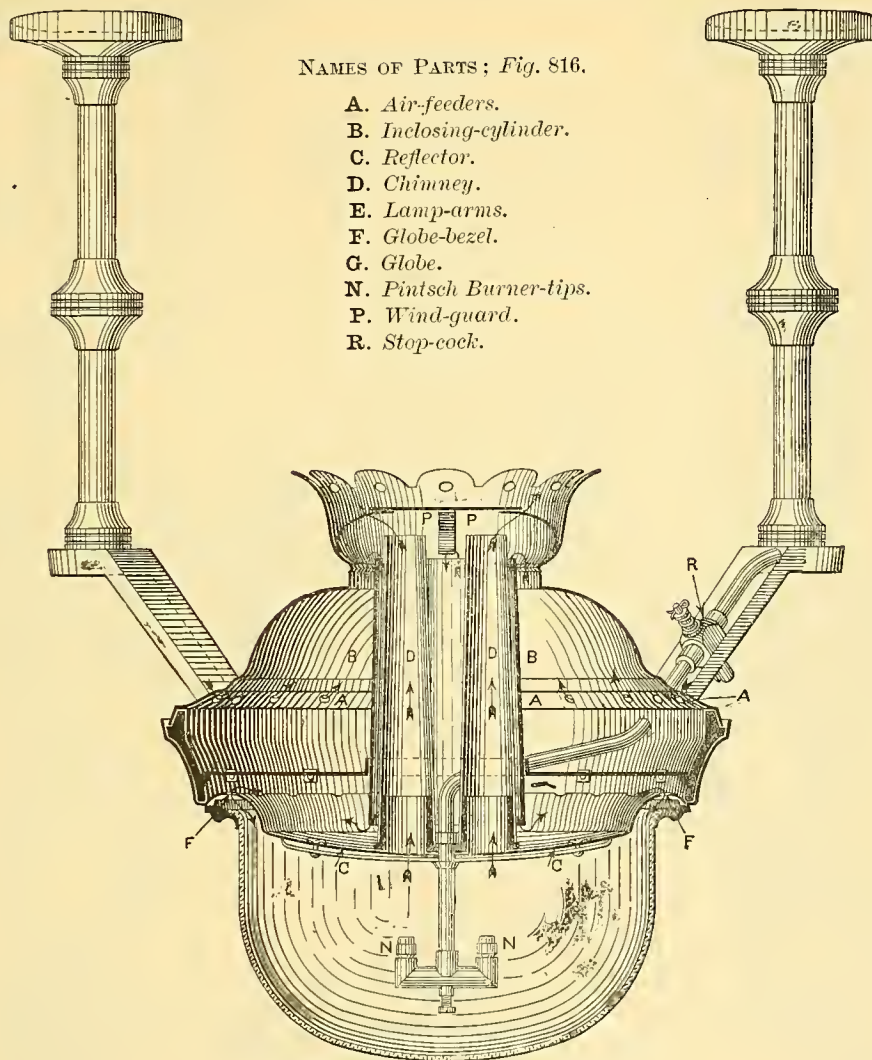


NAMES OF PRINCIPAL PARTS OF PINTSCH GAS APPARATUS; Fig. 812.

- A. Recipient Filling-valves (Figs. 818-819).
  - B. Recipient Valve (Fig. 816).
  - H. Recipients.
  - J. Pressure Regulator (Fig. 813).
- Main cock—a valve in saloon not shown.

(The Pressure Regulator is one complete fixture, adjusted by the maker. Names of the principal interior parts are DIAPHRAGM, DIAPHRAGM CONNECTING-ROD, DIAPHRAGM LEVER, REGULATING VALVE and DUST-ARRESTER.)





NAMES OF PARTS; *Fig. 816.*

- A. *Air-feeders.*
- B. *Inclosing-cylinder.*
- C. *Reflector.*
- D. *Chimney.*
- E. *Lamp-arms.*
- F. *Globe-bezel.*
- G. *Globe.*
- N. *Pintsch Burner-tips.*
- P. *Wind-guard.*
- R. *Stop-cock.*

*Fig. 816. PINTSCH TWO-LIGHT STANDARD GAS-BURNER.*

(Four-light burners are the same in substance and are generally used in the United States. Four-light burners of this pattern burn about  $2\frac{1}{2}$  cu. ft. per hour. The air-supply is heated before reaching the flame, to increase the efficiency of the burner.)

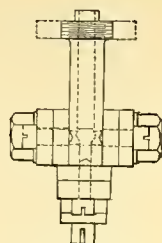


Fig. 817.  
RECIPIENT VALVE

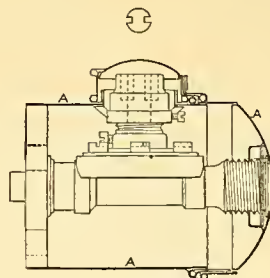


Fig. 818.

RECIPIENT FILLING VALVE.

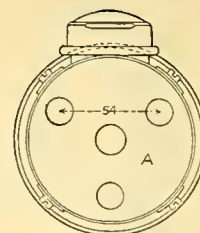


Fig. 819. End View.

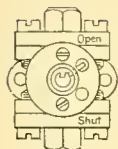


Fig. 820.  
Plan.



Fig. 821.  
Elevation.

MAIN COCK.

(Usually placed in saloon; controls all lamps at once.)



Fig. 822..  
LAMP-KEY.  
(Also fits Main Cock.)

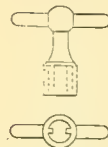
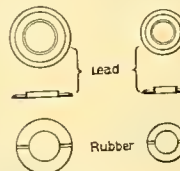


Fig. 823.  
VALVE-KEY.  
(Fits all high-pressure Valves.)



Figs. 824-825. WASHERS.  
Used for all flanges; designed  
to keep the rubber from de-  
teriorating contact with the  
gas.

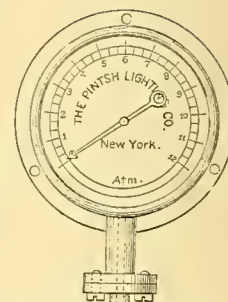


Fig. 826. PRESSURE-GAUGE.  
Usually placed in saloon.  
Registers atmospheres  
and not pounds, for con-  
venience in computing  
volume of gas in tank.

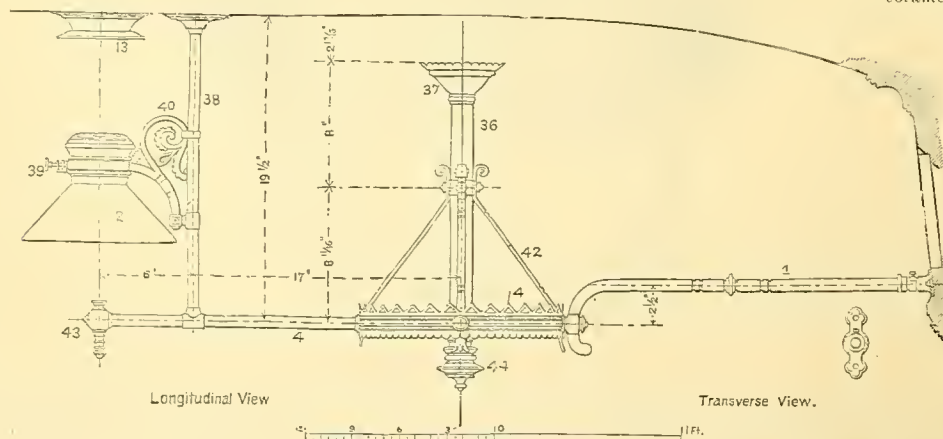


Fig. 827. GAS CHANDELIER. PENNSYLVANIA RAILROAD STANDARD PASSENGER CAR (Figs. 178-185). "QUEEN ANNE" style.

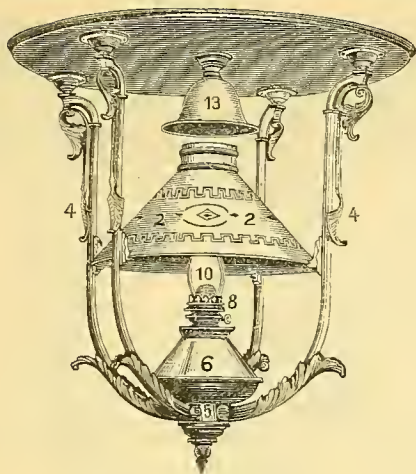


Fig. 827 1/2.  
CENTRE-LAMP. (Old style.)

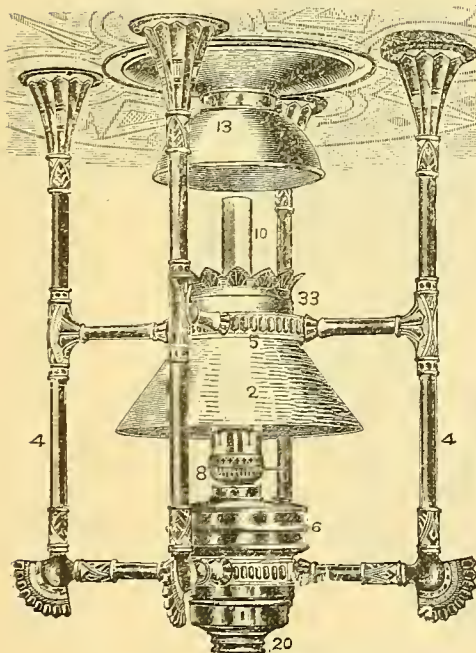


Fig. 829. "TORNADO" CENTRE  
LAMP (DROP, 23 in.)

## LAMPS.

NAMES OF PARTS OF LAMPS,  
ETC.; Figs. 827 1/2-871.

1. Lamp-stay.
2. Lamp-shade.
3. Lamp globe Chimney.
4. Lamp-arms.
5. Lamp-ring.
6. Lamp-reservoir.
7. Globe-holder.
8. Lamp-burner.
- 9-9. Drop of Lamp.
10. Lamp-chimney.
11. Lamp-chimney Holder.
12. Lamp-chimney Bracket.
13. Smoke-bell.
14. Lamp-reflector.
15. Lamp-chimney Reflector.
16. Side-lamp Holder.
17. Side-lamp Bracket.
18. Side-lamp Braes.
20. Lamp-bottom.
21. Candle-holder Cup.
22. Candle-holder Cup.
23. Candle-rods.
24. Candle-spring.
25. Alcove-lamp Reflector.
26. Bull's-eye.
27. Alcove-lamp.
28. Lamp-globe.
29. Smoke-bell stem.
30. Centre-stay.
31. Feed tube.
32. Roof-braee.
33. Shade-eap.

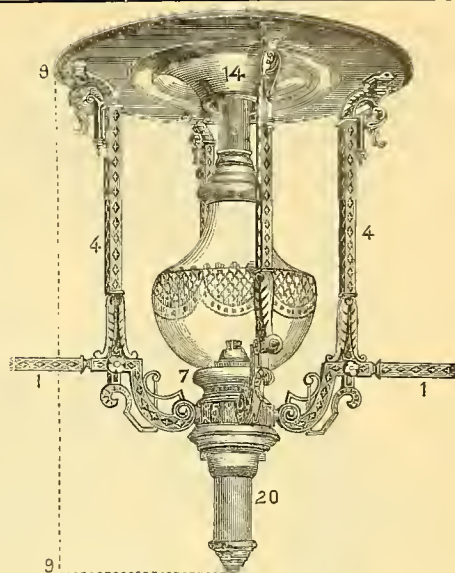


Fig. 828. CENTRE-LAMP. (Old Style  
Showing "DROP" of lamp (9-9).)

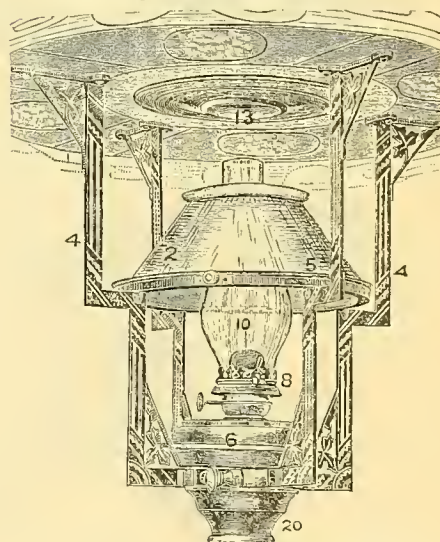


Fig. 830.  
CENTRE-LAMP, with BRACKET-ARMS and SPLIT-RING.  
(DROP, 16 1/2 in.)



Numbers refer to List on preceding page.

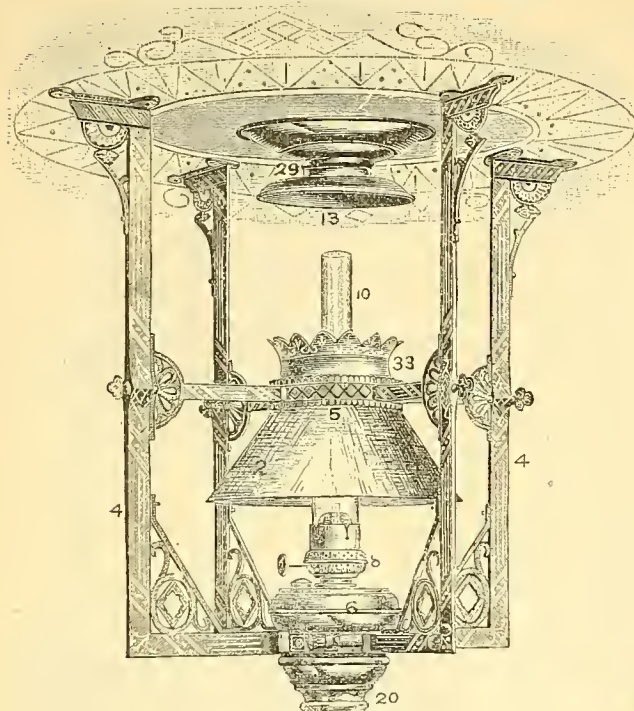


Fig. 831.

CENTRE-LAMP. (DROP, 22, in.)

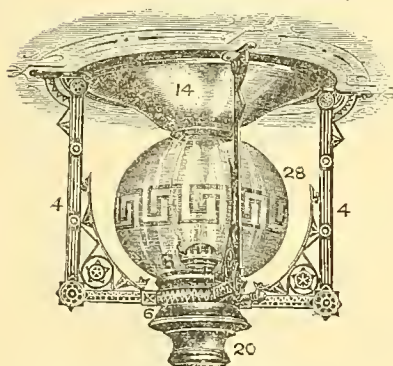


Fig. 833.

CENTRE-LAMP. (For Street Cars.)  
(DUAL burner, Figs. 873-874. DROP, 15 in.)

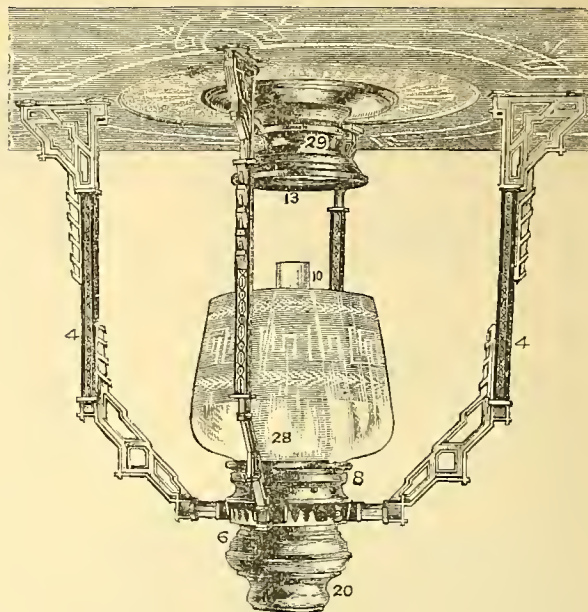


Fig. 832.

CENTRE-LAMP. (For either candle or oil.)

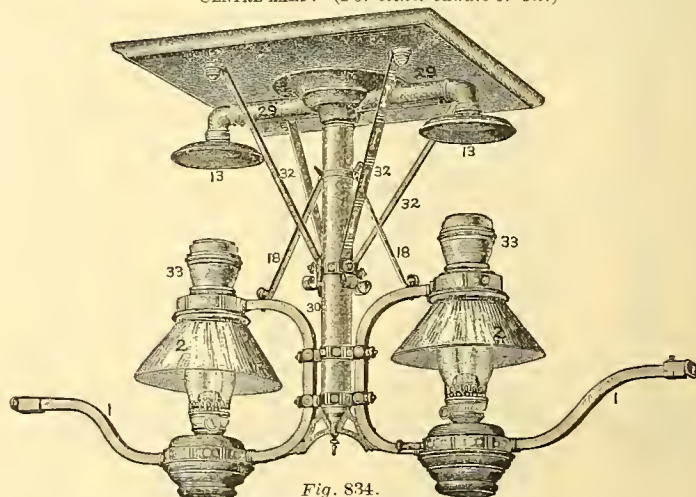


Fig. 834.

TWO-LIGHT CENTRE-LAMP.

(No. 5 or 8 shade, Figs. 942-944. No. 3 DUAL burner, Fig. 877. Centre to centre of burners, 18½ in. DROP, 27 in.)

Numbers refer to List on following page.

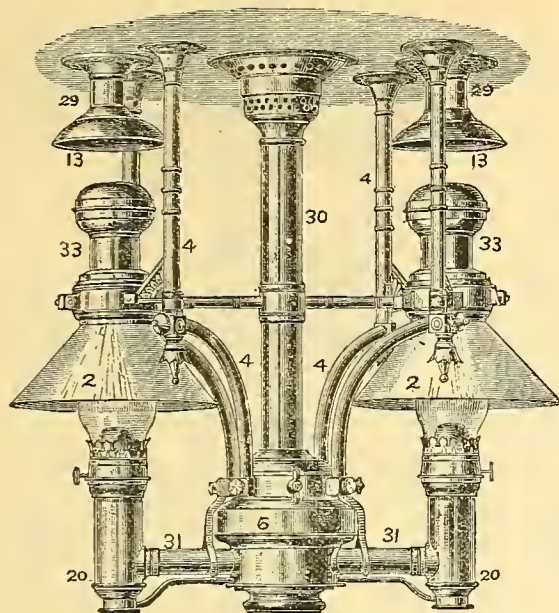


Fig. 835.

DOUBLE "HURRICANE" CENTRE-LAMP OR CHANDEFLIER.  
HICKS & SMITH patent. (Drop, 24 in.).

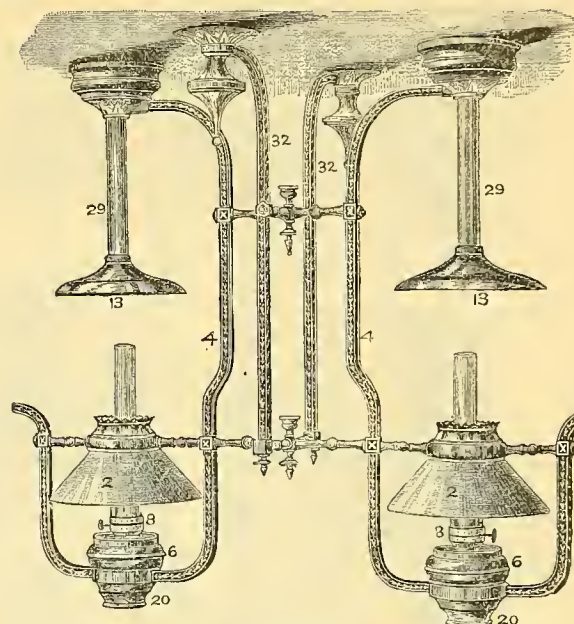


Fig. 836.

DOUBLE CENTRE-LAMP OR CHANDEFLIER.  
(ARGAND OR DUAL burners, Figs. 872-878. Drop, 32 in.)

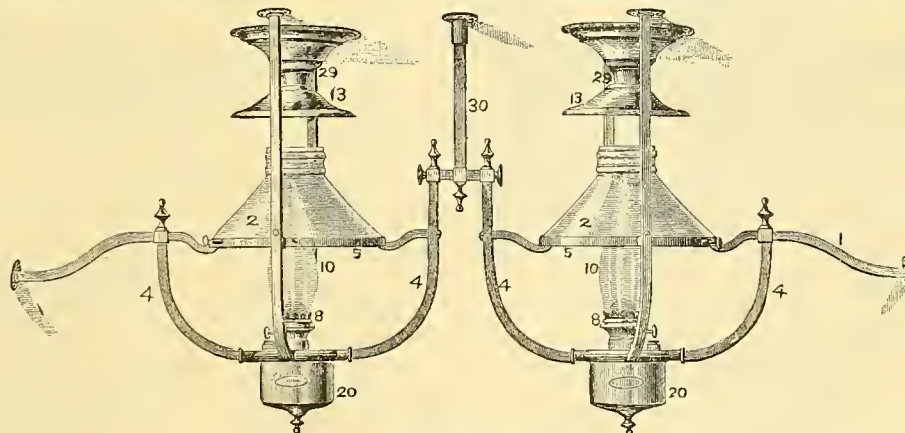


Fig. 837.

DOUBLE CENTRE-LAMP OR CHANDEFLIER.



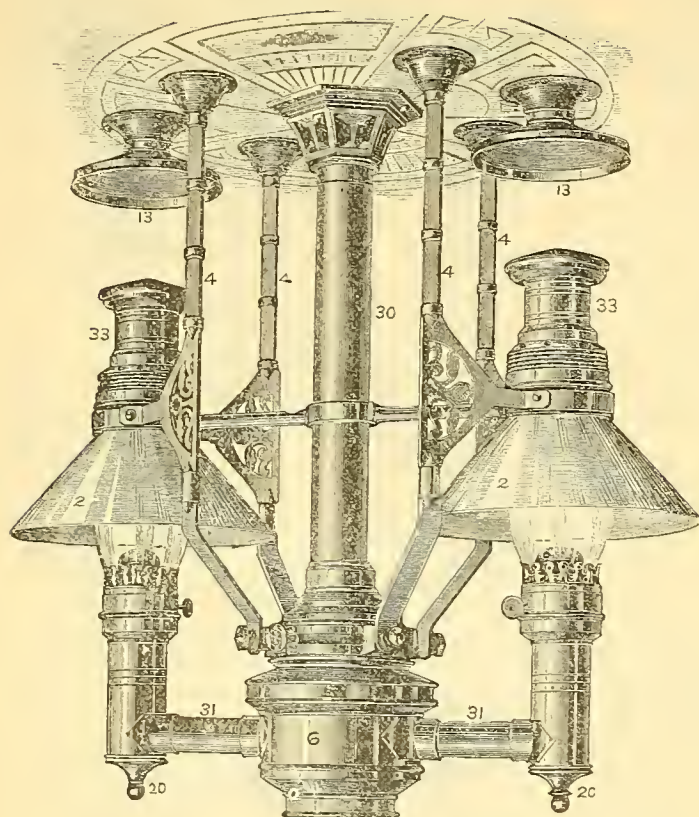


Fig. 838.

"TORNADO" DOUBLE CENTRE-LAMP OR CHANDELIER.  
(No. 3 DUAL burner, Fig. 877. DROP, 24 in.)

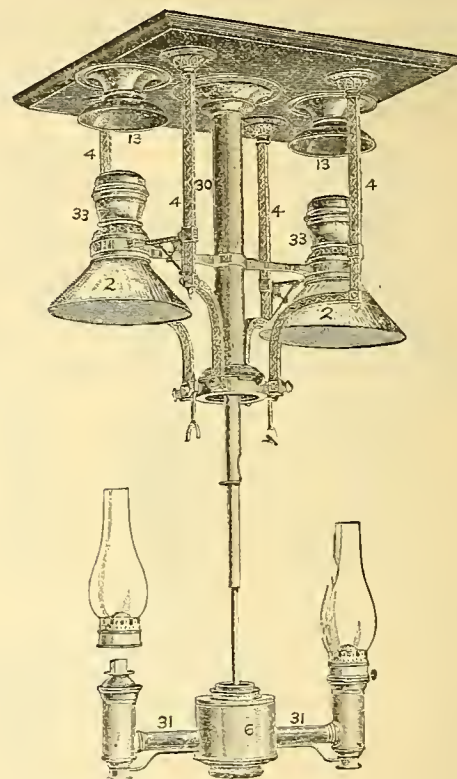


Fig. 839.

DOUBLE CENTRE-LAMP OR CHANDELIER, WITH TELESCOPE DROP.  
(Lowers to 3 ft. from the floor;  $3\frac{1}{2}$ -in. orifice for filling.)

# NAMES OF PARTS OF LAMPS, ETC.: Figs. 827½-871.

- |                        |                             |                            |                      |
|------------------------|-----------------------------|----------------------------|----------------------|
| 1. Lamp-stay.          | 9-9. Drop of Lamp.          | 17. Side-lamp Bracket.     | 26. Bull's-eye.      |
| 2. Lamp-shade.         | 10. Lamp-chimney.           | 18. Side-lamp Braces.      | 27. Alcove-lamp.     |
| 3. Lamp-globe Chimney. | 11. Lamp-chimney Holder.    | 20. Lamp-bottom.           | 28. Lamp-globe.      |
| 4. Lamp-arms.          | 12. Lamp-chimney Bracket.   | 21. Candle-holder Cap.     | 29. Smoke-bell Stem. |
| 5. Lamp-ring.          | 13. Smoke-bell.             | 22. Candle-holder Cup.     | 30. Centre-stay.     |
| 6. Lamp-reservoir.     | 14. Lamp-reflector.         | 23. Candle-rods.           | 31. Feed-tube.       |
| 7. Globe-holder.       | 15. Lamp-chimney Reflector. | 24. Candle-spring.         | 32. Roof-brace.      |
| 8. Lamp-burner.        | 16. Side-lamp Holder.       | 25. Alcove-lamp Reflector. | 33. Shade-cap.       |



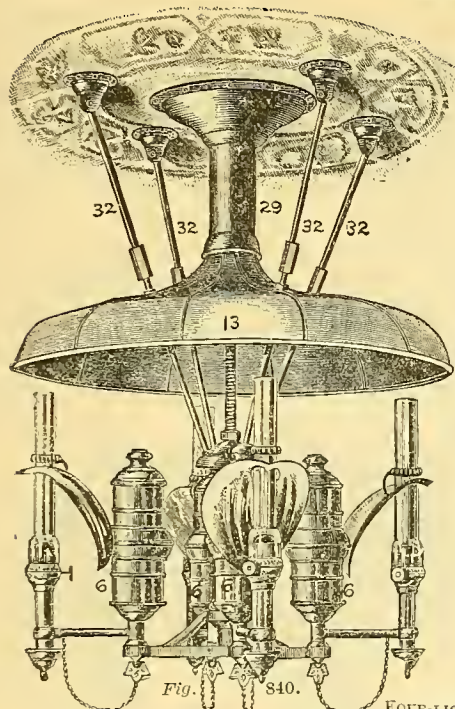
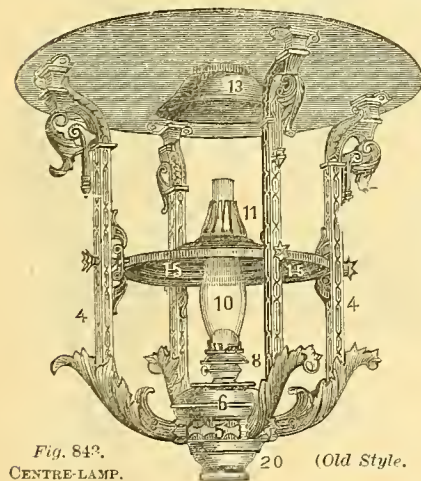


Fig. 840.

FOUR-LIGHT CENTRE-LAMP OR CHANDELIER.

Fig. 842.  
CENTRE-LAMP.

(Old Style,

"HARRISON" PATTERN.  
(DROP, 40 in.) (Especially designed for Postal Car Service. The burners and reservoirs revolve separately on RESERVOIR-PIVOTS and collectively on a REVOLVING LAMP-DISK (Fig. 841) so as to concentrate the light wherever desired.)

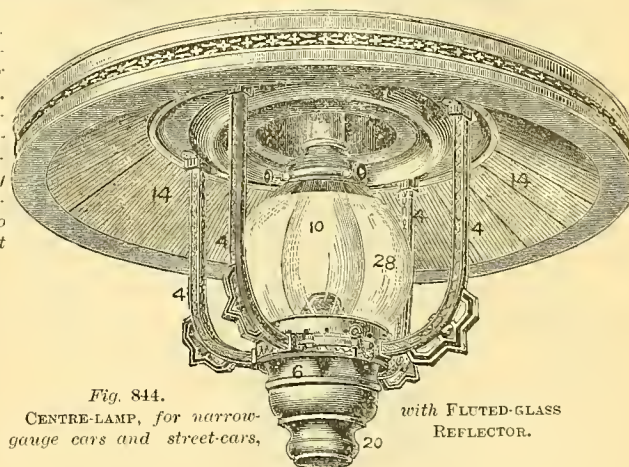


Fig. 844.

CENTRE-LAMP, for narrow-gauge cars and street-cars,

with FLUTED-GLASS REFLECTOR.

Numbers refer to List on preceding page.

# ADDITIONAL NAMES OF PARTS FOR Figs. 841-842.

- A. Smoke-bell, or Canopy.
- B. Protection-cap, or Wind-guard.
- C. Collar, for Smoke-bell Stem.
- D. Revolving Lamp-disk.
- E. Draft Valve.
- F. Centre-rod.
- G. Roof-brace Hub.

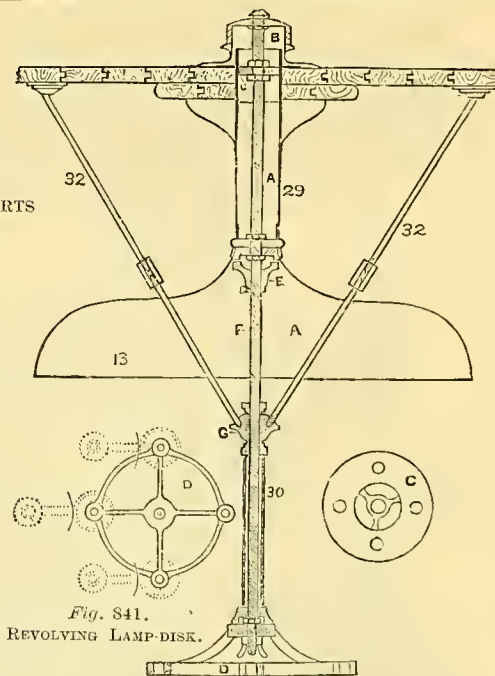


Fig. 841.

REVOLVING LAMP-DISK.

Fig. 842.

Construction details of Chandelier, Fig. 840.

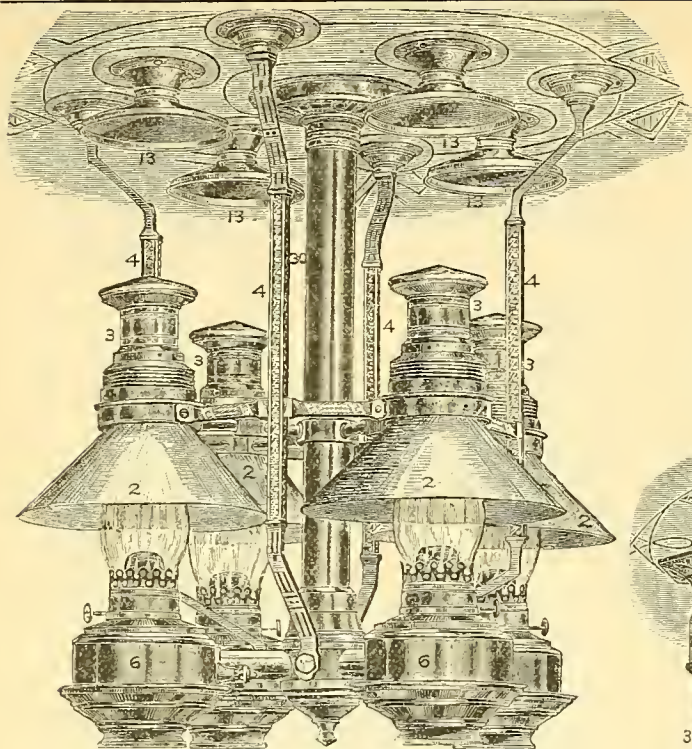


Fig. 845. "TORNADO" FOUR-LIGHT CENTRE-LAMP or CHANDELIER.  
(Drop, 24 in.)

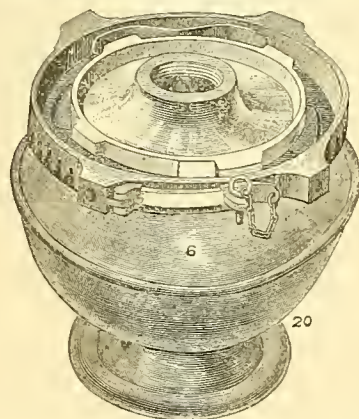


Fig. 847. CREAMER'S SAFETY LAMP-FASTENING.

NAMES OF PARTS OF LAMPS, ETC.; Figs. 827½-871.

- |                            |                            |
|----------------------------|----------------------------|
| 1. Lamp-stay.              | 18. Side-lamp Braces.      |
| 2. Lamp-shade.             | 20. Lamp-bottom.           |
| 3. Lamp-globe Chimney.     | 21. Candle-holder Cap.     |
| 4. Lamp-arms.              | 22. Candle-holder Cup.     |
| 5. Lamp-ring.              | 23. Candle-rods.           |
| 6. Lamp-reservoir.         | 24. Candle-spring.         |
| 7. Globe-holder.           | 25. Alcove-lamp Reflector. |
| 8. Lamp burner.            | 26. Bull's-eye.            |
| 9-9. Drop of Lamp.         | 27. Alcove-lamp.           |
| 10. Lamp-chimney.          | 28. Lamp-globe.            |
| 11. Lamp-chimney Holder.   | 29. Smoke-bell Stem.       |
| 12. Lamp-chimney Bracket.  | 30. Centre-stay.           |
| 13. Smoke-bell.            | 31. Feed-tube.             |
| 14. Lamp-reflector.        | 32. Roof-brace.            |
| 15. Lamp-chimney Reflector | 33. Shade-cap.             |
| 16. Side-lamp Holder.      |                            |
| 17. Side-lamp Bracket.     |                            |

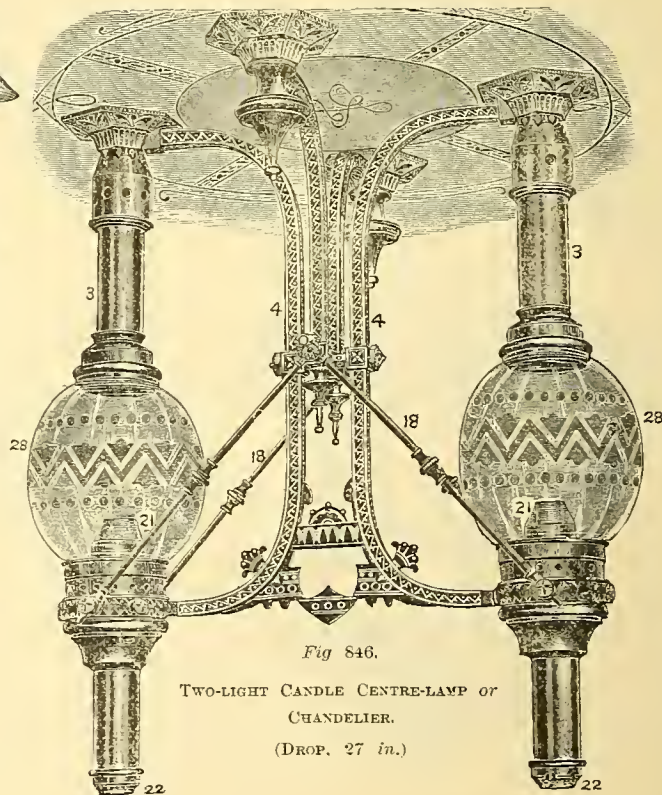
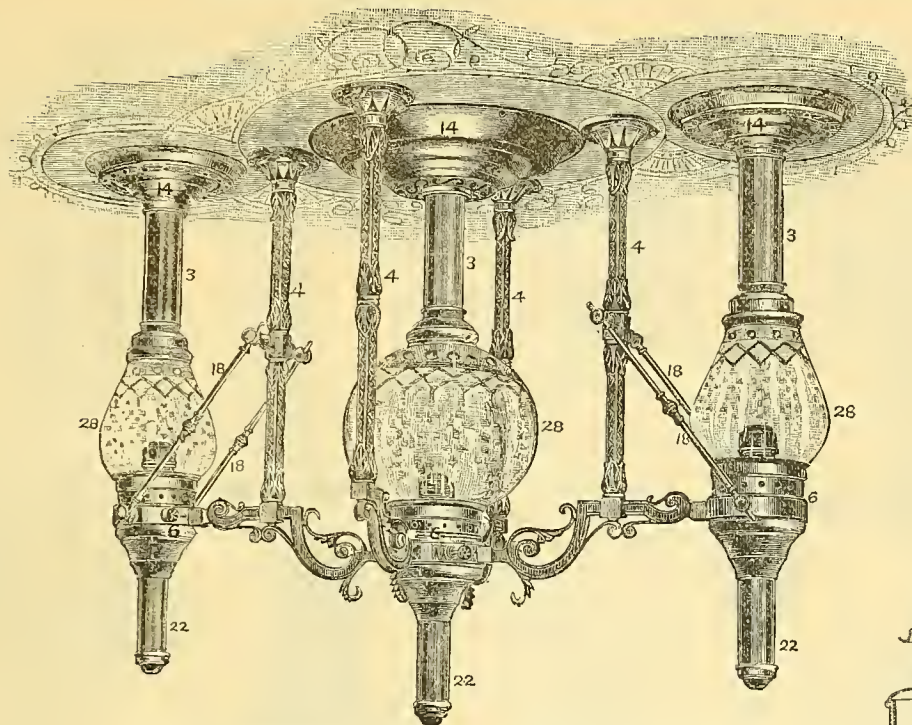


Fig 846.  
TWO-LIGHT CANDLE CENTRE-LAMP or  
CHANDELIER.  
(Drop, 27 in.)





Numbers refer to List on preceding page.

Fig. 848. THREE-LIGHT CANDLE CHANDELIER, with ADJUSTABLE GLOBES  
(Drop, 28 in.)

NAMES OF PARTS, MOEHRING ARGAND LAMP: Figs. 849-850.

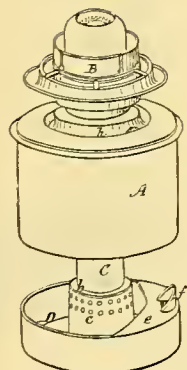


Fig. 849.  
Perspective View.  
MOEHRING ARGAND LAMP.

- |                             |                    |
|-----------------------------|--------------------|
| A. Reservoir, or Lamp-body. | c. Lamp-base Stem. |
| B. Lamp-burner.             | d. Drip-hole.      |
| C. Well.                    | e. Drip-shield.    |
| D. Lamp-base.               | f. Drip-spout.     |
| E. Lamp-bottom.             | g. Air-holes.      |
| a. Centre Draft-tube.       | n. Filling-groove. |
| b. Lamp-base Collar.        | i. Filling-tube.   |

(Perspective View of Burner, Fig. 872.)

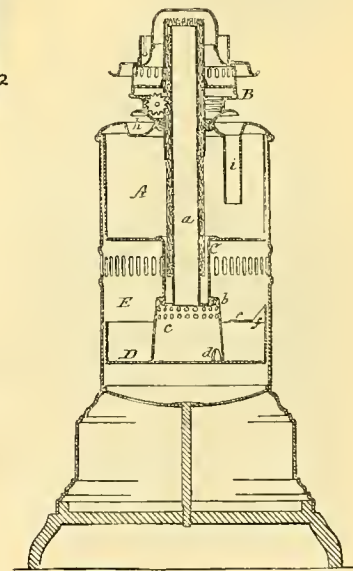


Fig. 850.  
Section.  
MOEHRING ARGAND LAMP.



Numbers refer to List of Names  
of Parts on second  
page back.

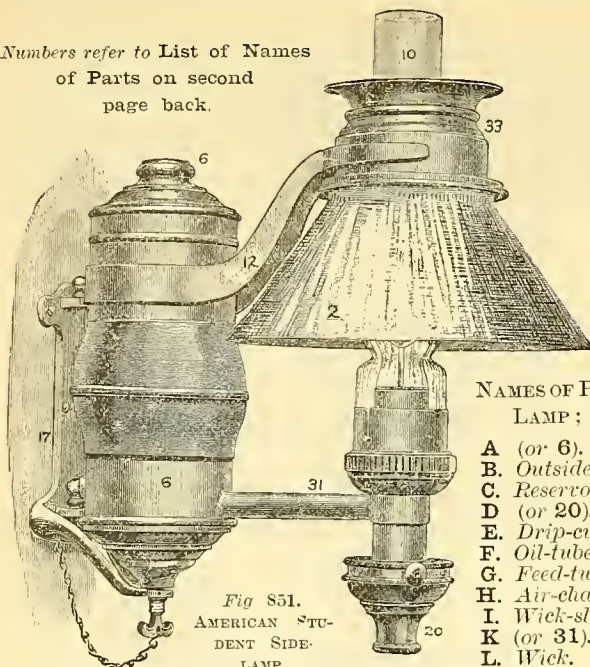


Fig. 851.  
AMERICAN STUDENT  
SIDE-LAMP.

(No. 5 or 8 Shade, Figs. 942-4; No. 11 Chimney, Fig. 929, "Mammoth" Argand Burner.)

NAMES OF PARTS OF STUDENT  
LAMP; Figs. 852-854.

- A (or 6). Reservoir.
- B. Outside Cylinder.
- C. Reservoir Drip-chamber.
- D (or 20). Drip-cup.
- E. Drip-cup Screw.
- F. Oil-tube.
- G. Feed-tube Collar.
- H. Air-chamber.
- I. Wick-sleeve.
- K (or 31). Feed-tube.
- L. Wick.
- N. Air-tube.
- O. Interior Screw-tube.

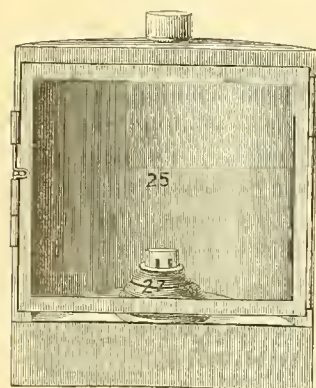


Fig. 855.

LAMP-ALCOVE and ALCOVE-LAMP.

(More modern form shown in Fig. 864, which see.)

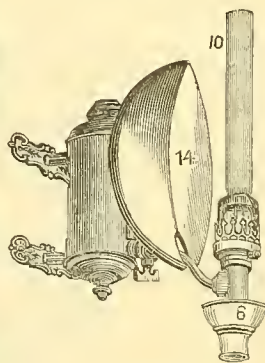


Fig. 856

MAIL-CAR LAMP.

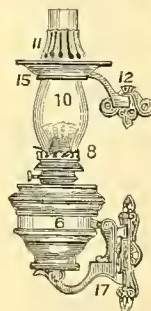


Fig. 857.

SIDE-LAMP.

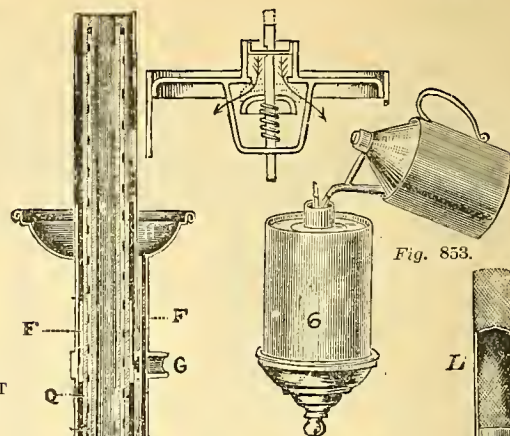


Fig. 853.

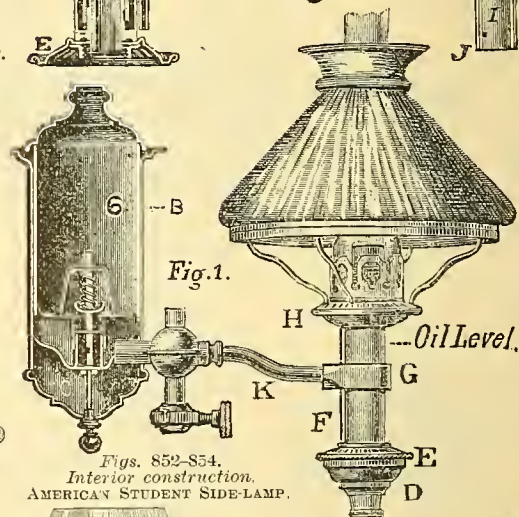


Fig. 1.

Figs. 852-854.  
Interior construction.  
AMERICAN STUDENT SIDE-LAMP.

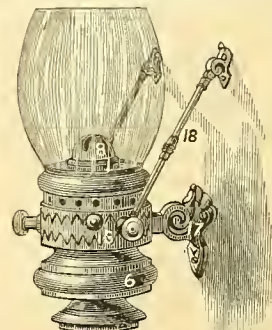


Fig. 858. SIDE-LAMP, with BRACES.

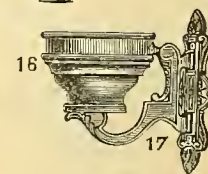


Fig. 859.

SIDE-LAMP HOLDER and  
BRACKET.

Numbers refer to List of Names of Parts on third page back.

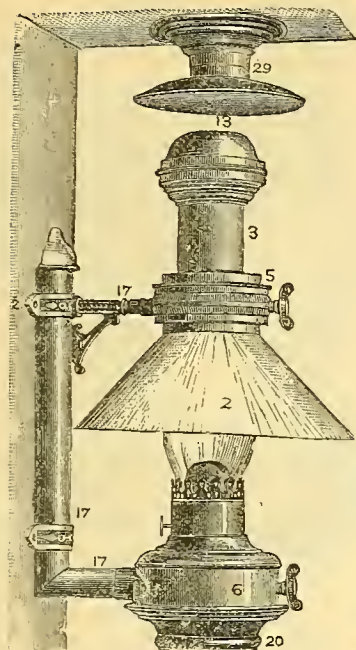


Fig. 860.

"HURRICANE" SIDE-LAMP.

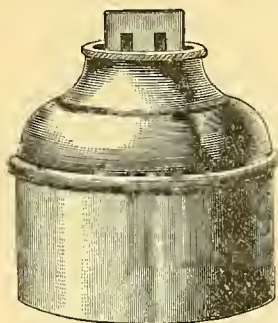


Fig. 861.

ALCOVE-LAMP for Sleeping Cars.

(See Figs. 855 and 864.)

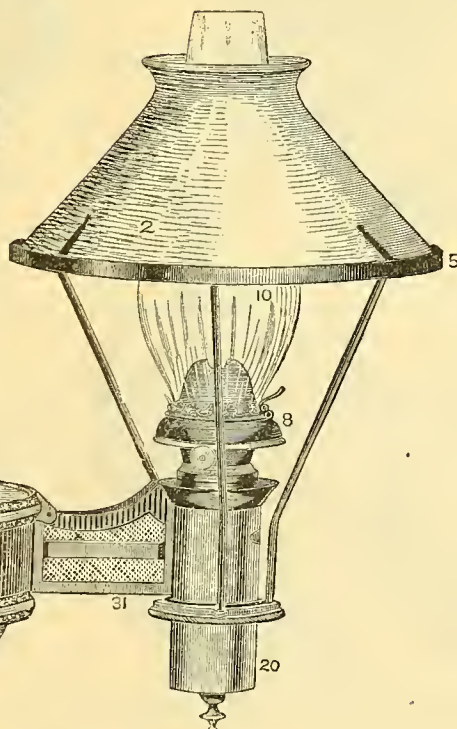


Fig. 863. POSTAL CAR SIDE-LAMP.

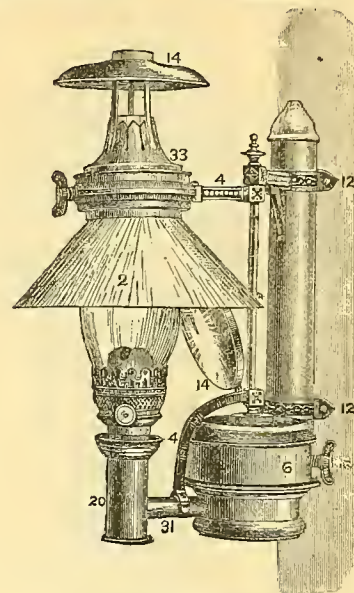
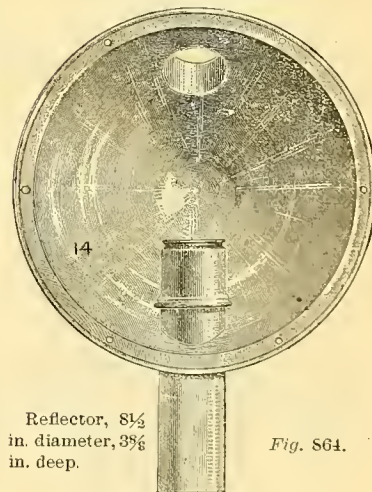


Fig. 862.

POSTAL CAR SIDE-LAMP.



Reflector,  $8\frac{1}{2}$   
in. diameter,  $3\frac{3}{8}$   
in. deep.

Fig. 864.

SIDE PANEL-LAMP, for oil or candle.  
(Principally for sleeping cars. Used in  
panels between windows arranged as in  
Fig. 678. Usually covered during the  
day by Mirror-sash, Fig. 1256.)



Numbers refer to List of Names of Parts on fourth page back.

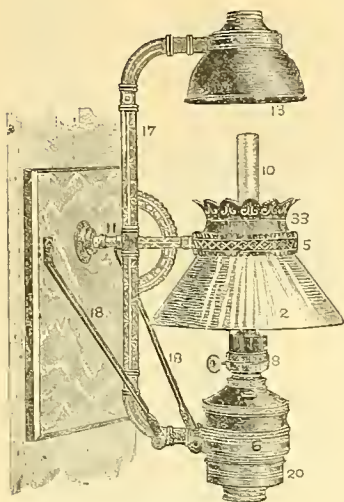


Fig. 865.  
SIDE-LAMP.  
ARGAND or DUAL burner.

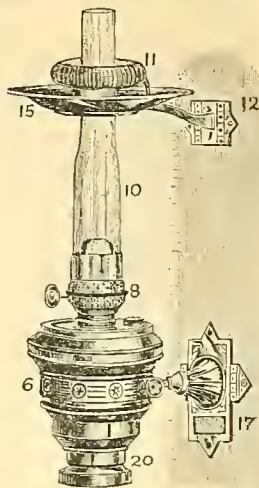


Fig. 866. SIDE-LAMP, with combined Reflector and  
Chimney-holder. (ARGAND burner.)  
See also Fig. 938.

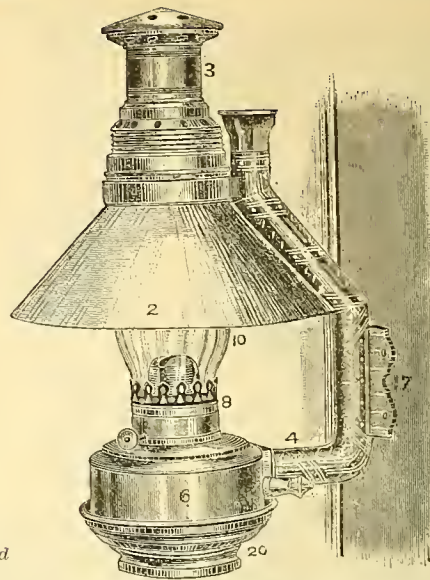


Fig. 867. "TORNADO" SIDE-LAMP, with adjust-  
able SHADE-HOLDER.  
(No. 3 DUAL burner, Fig. 877.)



Fig. 868.  
SIDE-LAMP, with adjustable  
or loose Globe.

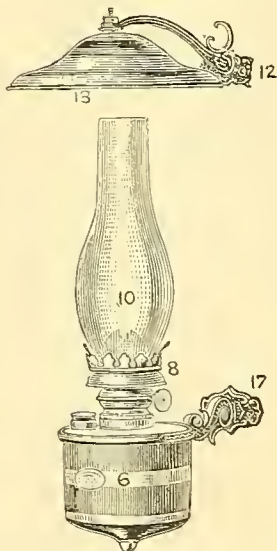


Fig. 869. SIDE-LAMP, with separate  
Smoke-bell and SMOKE-BELL BRACKET.



Fig. 870. SIDE-LAMP.  
For candles.

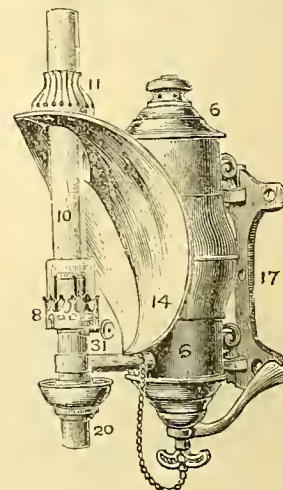


Fig. 871.  
POSTAL-CAR SIDE-LAMP.



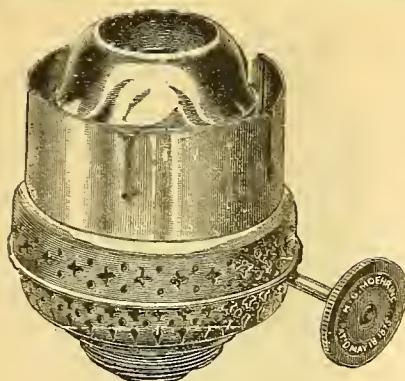


Fig. 872.  
MOEHRRING ARGAND BURNER.  
( $\frac{3}{4}$  full size.)

No. 10 chimney, Fig. 928. Burner shown in Section, Fig. 850.

The TABER BURNER is the same as Dual No. 2, Figs. 873-874, except that it has two wicks in one tube instead of a separate tube for each wick.

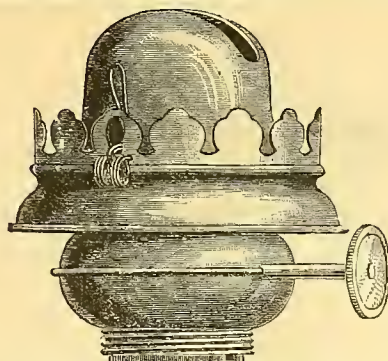


Fig. 873. DUAL BURNER. ( $\frac{3}{4}$  full size.)  
No. 2 or B, with SKIRT. (2, 3 and 8 chimney, Figs. 926-927.)

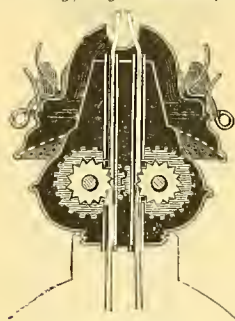


Fig. 874. DUAL BURNER. Section.

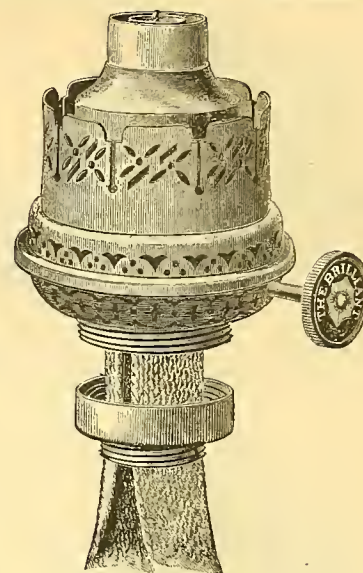


Fig. 875.  
"BRILLIANT" ARGAND BURNER.  
( $\frac{3}{4}$  full size.)

Nos. 1 and 2, Small Student (No. 8 chimney). No. 3, Large Student (No. 7 chimney, Figs. 926-936.)

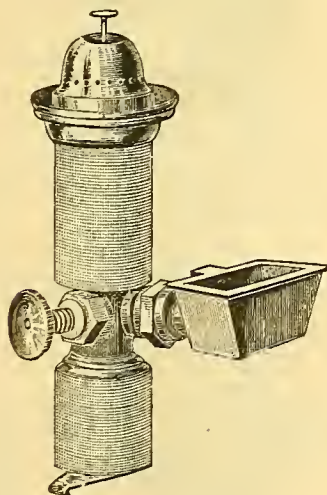


Fig. 876.  
HEADLIGHT BURNER.  
(For 16 to 23 in. headlight reflectors.)

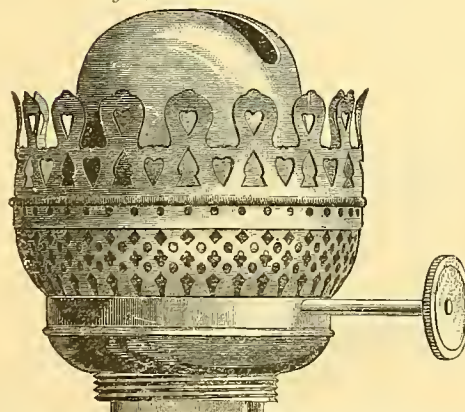


Fig. 877. DUAL BURNER. No. 3 or D, without skirt.  
(No. 24 chimney, Fig. 934.)

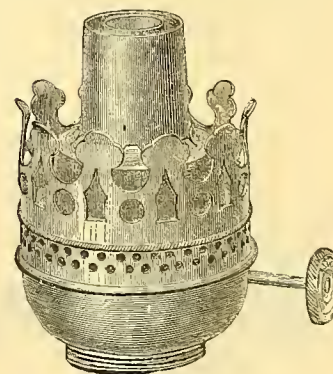


Fig. 878.  
ASTRAL ARGAND BURNER.  
(No. 8 chimney, Figs. 926-936 list.)

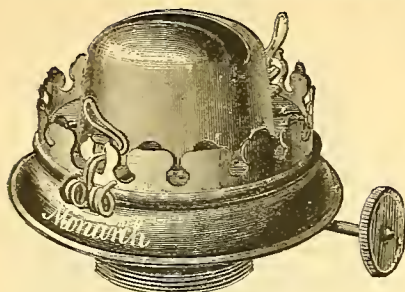
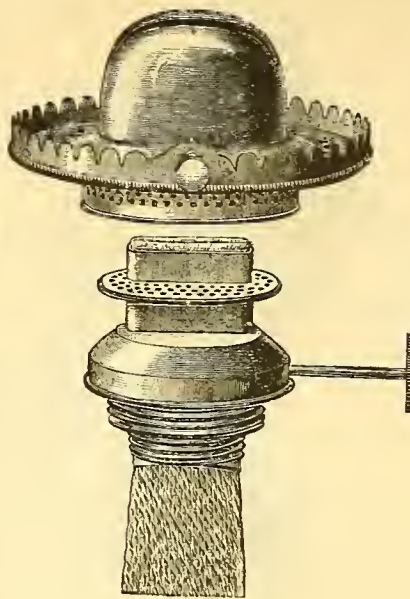


Fig. 879.  
"MONARCH" BURNER ( $\frac{3}{4}$  full size).  
(Nos. 2, 3 and 18 Chimneys, Figs. 926-933.)



No. 2  
Fig. 880.  
"SUNLIGHT" SLIP BURNER.  
(Nos. 14 and 17 Chimneys, Fig. 931.)

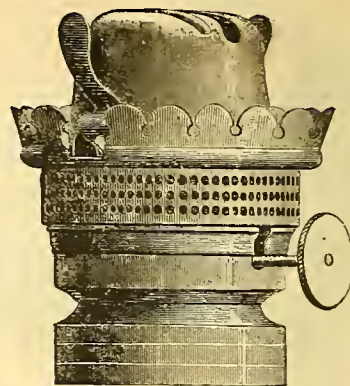


Fig. 881.  
TWO-SPRING SLIP BURNER.

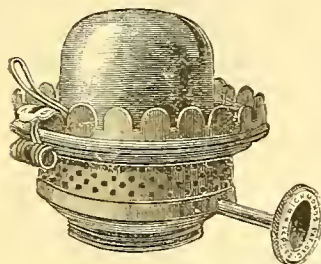


Fig. 882.  
"RICHMOND" SPRING BURNER ( $\frac{3}{4}$  full size).  
(Nos. 2, 3 and 18 Chimneys, Figs. 926-933.)

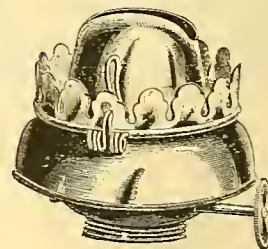


Fig. 883.  
"ALEXANDER" SLIP BURNER.  
(Nos. 2, 3 and 18 Chimneys, Figs. 926-933.)

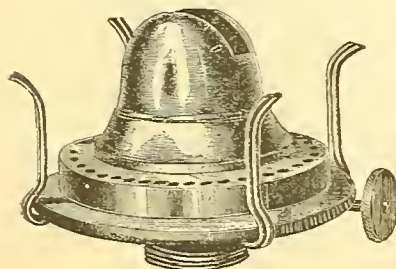


Fig. 884.  
"BANNER" SUN BURNER ( $\frac{3}{4}$  full size).  
("Sun" Chimney, Fig. 950.)

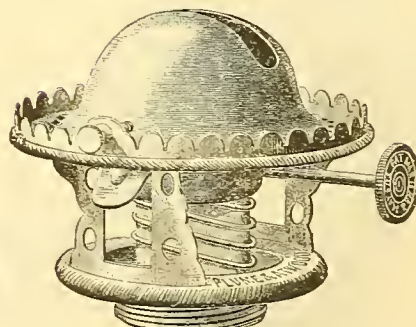


Fig. 885.  
"UNIQUE" SUN-HINGE BURNER.  
(Sun-Hinge Chimney, Nos. 14 and 17, Fig. 931.)

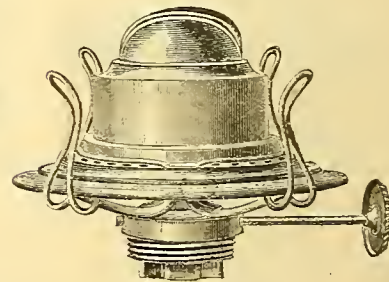


Fig. 886.  
"OPPOSITION" SUN BURNER, with GAS TUBE.



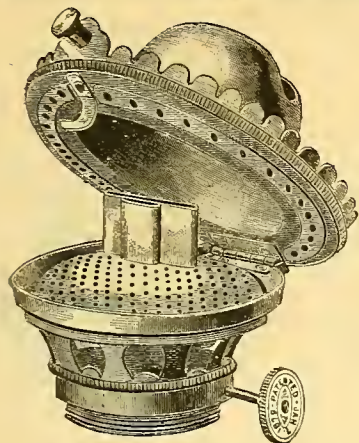


Fig. 887.  
"SUN-HINGE" BURNER.  
(Sun-hinge Chimney, Nos. 14 and 17, Fig. 937.)

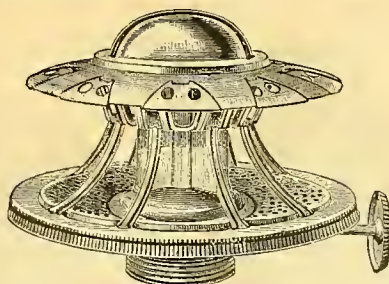


Fig. 888.  
"BEST" SUN BURNER.

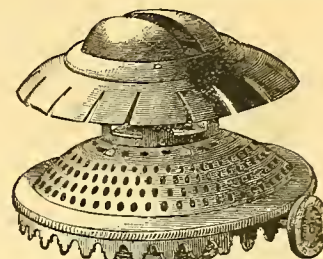


Fig. 889.  
SUN BURNER.  
(Original Form.)

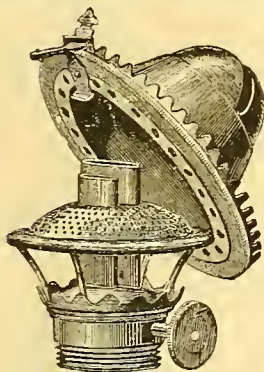


Fig. 890.  
NO CHIMNEY SUN-HINGE BURNER.

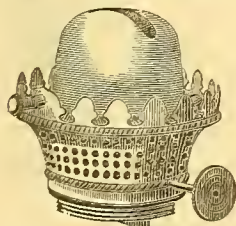


Fig. 892.  
SCREW BURNER.  
(Old Style.)

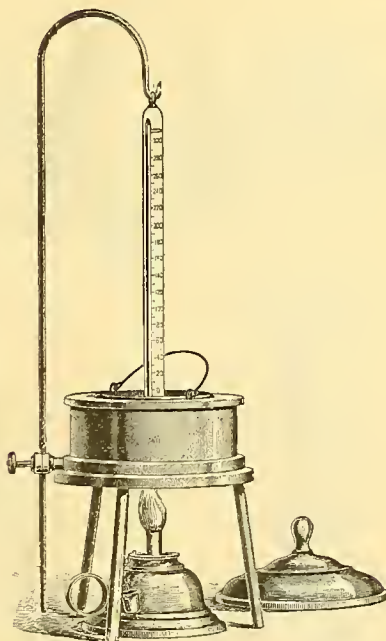


Fig. 895.  
OIL TESTER.  
(For directions see Dictionary.)

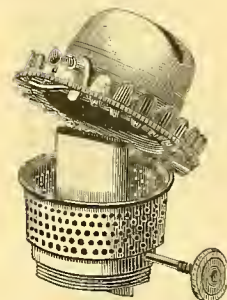


Fig. 893.  
HINGE BURNER.  
(Old Style.)

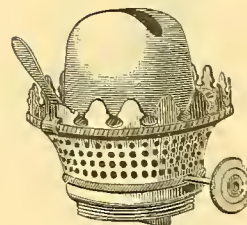


Fig. 894.  
SPRING BURNER.  
(Old Style.)



Fig. 890 on preceding page and Figs. 896-961 on this page are No-chimney Burners.

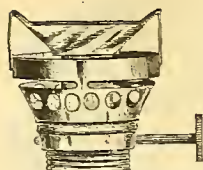


Fig. 896. "ALADDIN."  
Short Body.

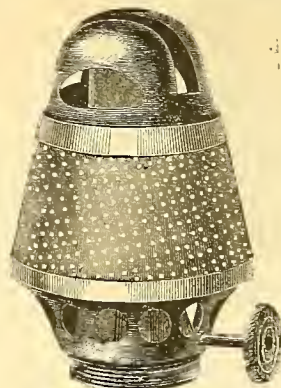


Fig. 897. "SAVAGE."

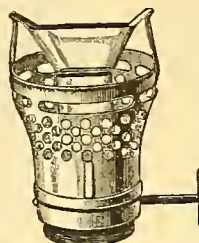


Fig. 898. "ALADDIN."  
Long Body.

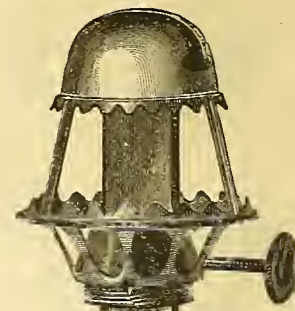


Fig. 899. "CHAMPION."

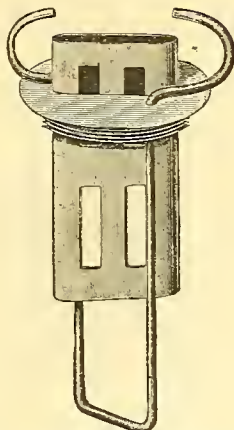


Fig. 902. MINOT HEATING BURNER.  
( $\frac{2}{3}$  size.)

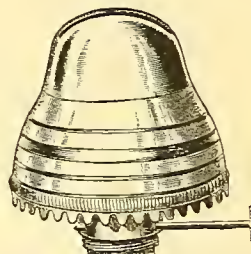


Fig. 900. "ZENITH."

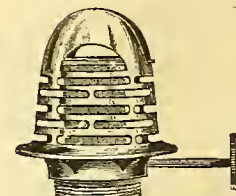


Fig. 901. "CALLENDER."



Fig. 903. CANDLE-BOTTOM.

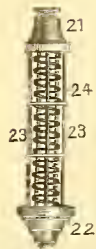


Fig. 904. CANDLE-HOLDER.  
(Inside of candle-bottom.)



Fig. 905. LAMP-BOTTOM FOR  
MINERAL OIL.



Fig. 906. LAMP-BOTTOM  
FOR LARD OIL.

NAMES OF PARTS OF LAMPS, ETC.; Figs. 903-906.

6. Lamp-reservoir.  
8. Lamp-burner.

21. Candle-holder Cap.  
22. Candle-holder Cup.

23. Candle-rods.  
24. Candle-spring.

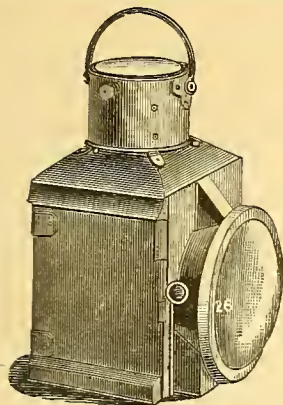


Fig. 907.

TRAIN-SIGNAL, TAIL, OR BULL'S-EYE LAMP.

(Others of this class are shown in Figs. 959-971.)

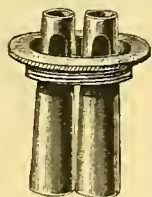


Fig. 911.

OIL-SCREWS, TUBED.

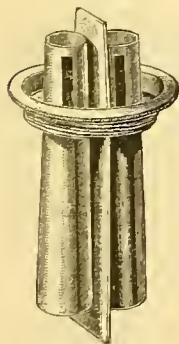


Fig. 912.

OIL-SCREWS, TUBED, with HEATER-PLATE.

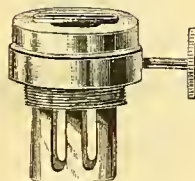


Fig. 913.

LARD-OIL RATCHET BURNER.

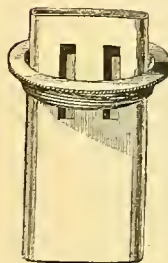


Fig. 914.

LARD-LAMP SCREW.



Fig. 909.

REDUCING COLLAR.

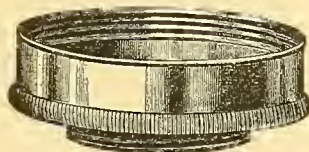


Fig. 910.

EXPANDING COLLAR.



Figs. 915-916.

FEEDER-CUP AND COLLAR.



Fig. 917.

OIL-SCREW.

(Made blank or pierced.)



Fig. 918.

OIL-LAMP HOOP.

(Butted.)



Fig. 919.

OIL-SCREW.

(Hollow.)

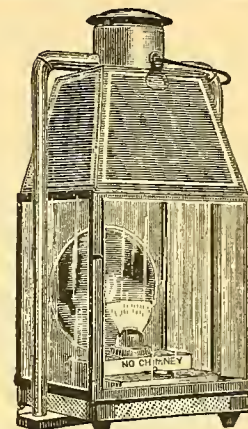


Fig. 908.

TUBULAR SQUARE LAMP.  
(27 in. high.)



Fig. 920.

LAMP-COLLAR.



Fig. 921.

SOLID LAMP-HOOP.



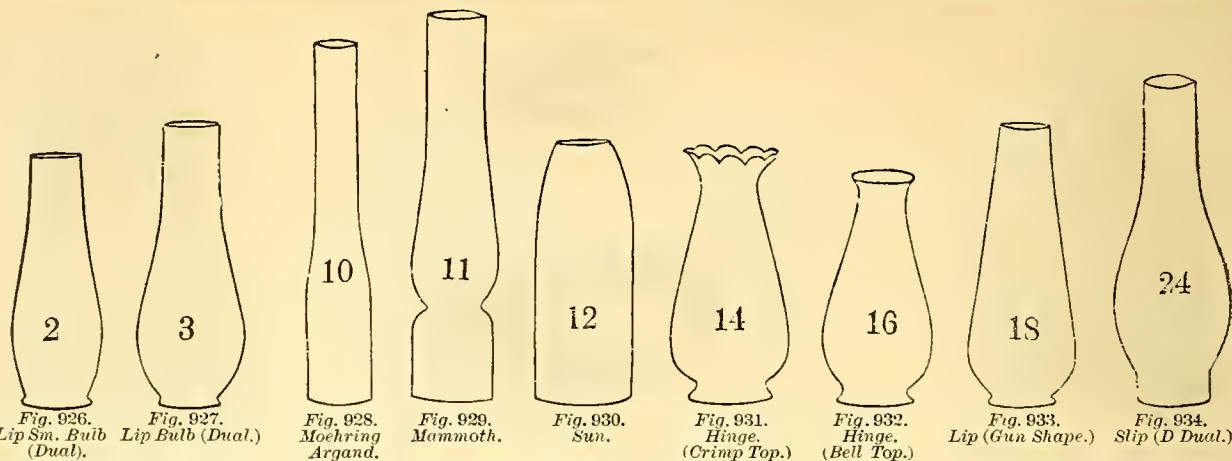
Figs. 922-923.

OIL-SCREW AND HOOP.

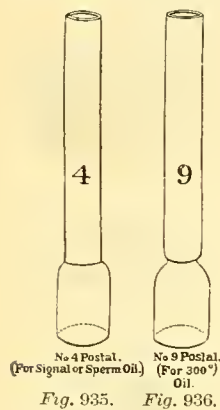


Figs. 924-925.

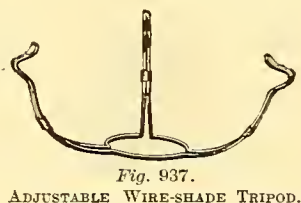
FEEDER-SCREW AND HOOP.



STANDARD STYLES OF LAMP CHIMNEYS. (See table of Standard dimensions in Dictionary under LAMP CHIMNEYS. The use of these standards in the trade is general, but not universal.)



STUDENT-LAMP CHIMNEYS.



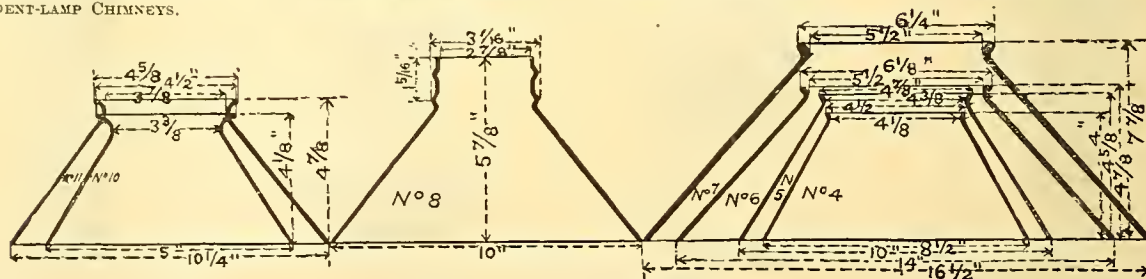
COMBINED REFLECTOR AND CHIMNEY-HOLDER.  
 (See also Fig. 866.)



SMOKE-BELL and SMOKE-BELL BRACKET.  
 (No. 3.)



LAMP CANOPIES.



STANDARD STYLES OF LAMP-SHADES. (See also "LAMP-SHADE" in Dictionary. The use of these Standards in the trade is general, but not universal.)



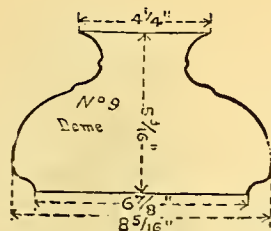


Fig. 945.

"DOME" LAMP-SHADE.

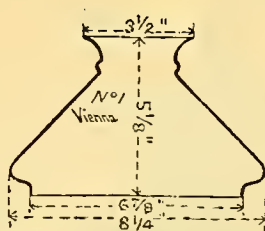


Fig. 946.

"VIENNA" LAMP-SHADE.

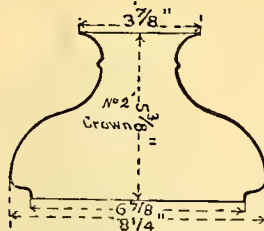


Fig. 947.

"CROWN" LAMP-SHADE.

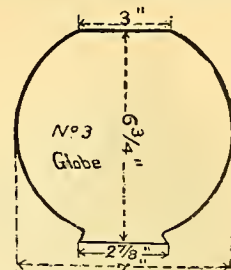


Fig. 948.

"GLOBE" LAMP-SHADE or LAMP-GLOBE.

STANDARD STYLES OF LAMP-SHADES: SPECIAL FORMS FOR STUDENT AND OTHER LAMPS.

(See also "LAMP-SHADE" in Dictionary.)

(The use of these Standards in the trade is general, but not universal.)

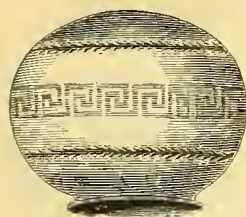


Fig. 949.

ROUND LAMP-GLOBE.

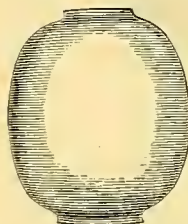


Fig. 950.

MELON-SHAPED LAMP-GLOBE.



Fig. 951.

EGG-SHAPED LAMP-GLOBE.

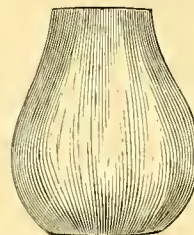


Fig. 952.

PEAR-SHAPED LAMP-GLOBE.

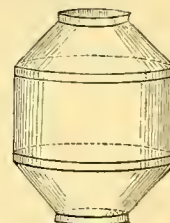


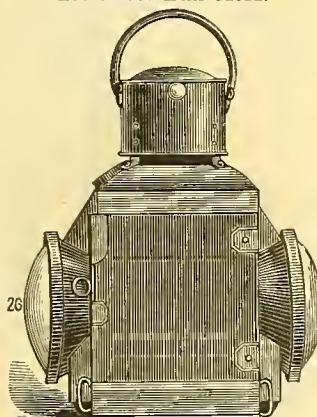
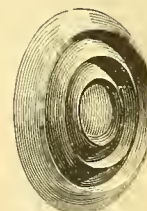
Fig. 953.

DOUBLE-CONE-SHAPED LAMP-GLOBE.

Fig. 954.  
Section.Fig. 955.  
Front View.

SEMAPHORE LENS.

(A modified form of the Fresnel Lens, Figs. 957-958.)

Fig. 956. DOUBLE-LENS, TAIL, BULL'S-EYE or SIGNAL LAMP.  
(Others of this class are shown in Figs. 959-971.)Fig. 957.  
Front View.Fig. 958.  
Section.

FRESNEL LENS.

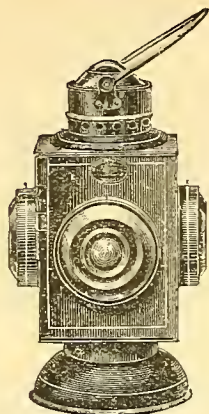


Fig. 959.  
SIDE TAIL-LIGHT.  
(Penna. R. E. Standard.)

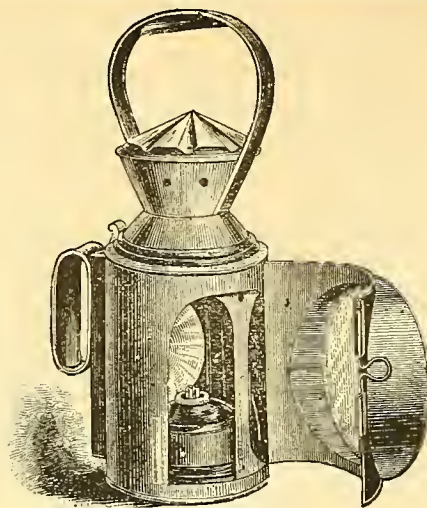


Fig. 960.  
TRICOLORED INSPECTOR'S LAMP.  
(Another device for the same purpose is  
shown in Figs. 972-973.)



Fig. 961.  
SQUARE RAILROAD SIGNAL-LIGHT.

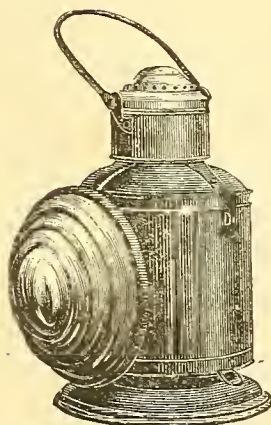


Fig. 962.  
CIRCULAR TAIL-LIGHT.  
(8-in. Semaphore Lens.)

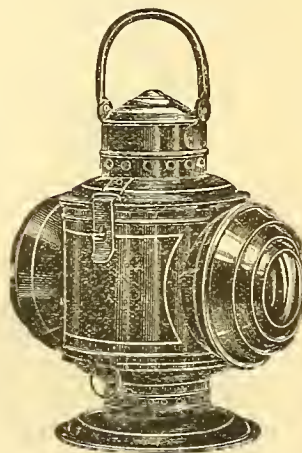


Fig. 963.  
UTILITY TAIL-LIGHT.  
(Weight, 4 lbs.)



Fig. 964.  
"BLIZZARD" SIGNAL-LIGHT.





Fig. 965. Carrying "Blizzard"  
Signal-light.  
COOLBAUGH'S SIGNAL-LIGHT HOLDER.

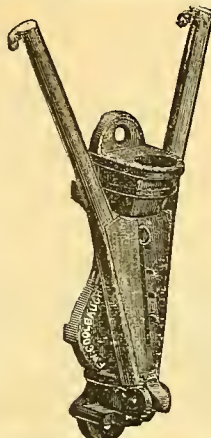


Fig. 966. Folded up,  
not in use.  
(Weight, 2 lbs.)



Fig. 967.  
Folded up, carrying flag.

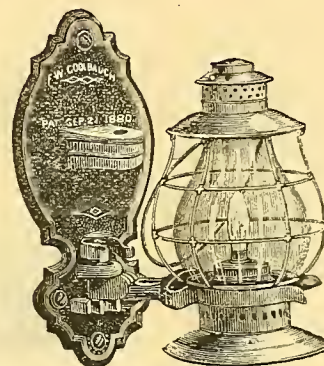


Fig. 968.  
In use, carrying Lamp.  
COOLBAUGH'S LANTERN AND FLAG-HOLDER, with THREE-WAY JOINT

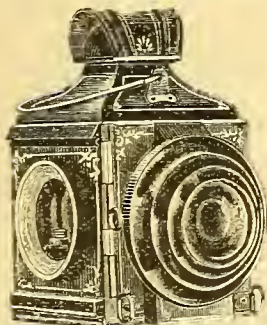


Fig. 969. (8-in. lens; 4 1/4-in.  
side plain light.)  
TRAIN-SIGNAL OR TAIL-LAMP.

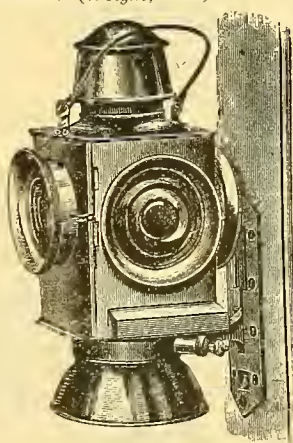


Fig. 970. TRAIN-SIGNAL OR TAIL-LIGHT.  
(Carried by a SOCKET-PLATE,  
BRACKET and BRACKET-RING.)

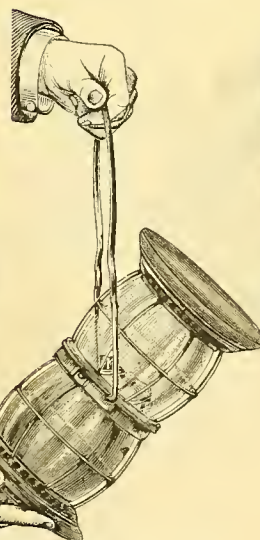


Fig. 973. Lantern complete in act of changing  
signal from white to red.

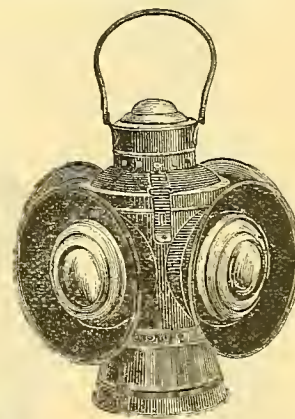


Fig. 971.  
OPERATORS' TRAIN-ORDER TARGET  
LAMP.  
(5-in. Semaphore-lens.)



Fig. 972.  
Lamp and  
Handle.

BURRELL BI-COLORED SIGNAL LANTERN. (Another device for the same purpose is shown in Fig. 960.)



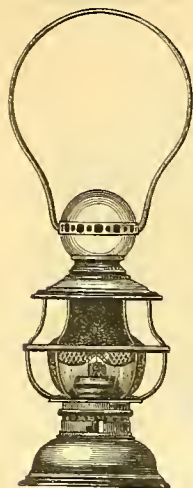


Fig. 974.  
CONDUCTOR'S LANTERN.



Fig. 975.

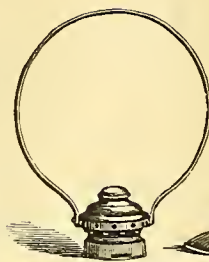


Fig. 976. Reflector.  
Bail and Cap,  
CONDUCTOR'S LANTERN (New Style).

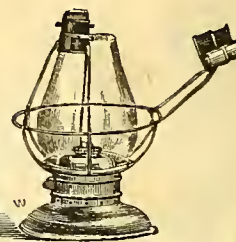


Fig. 977. Reflector.  
Showing movable Globe-holder.



Fig. 979.  
CONDUCTOR'S LANTERN.



Fig. 981.  
"EAR-BAIL" RAILROAD  
LANTERN Single Guard



Fig. 982.  
"EAR-BAIL"  
LANTERN,  
with HEATER.



Fig. 980. RAILROAD LANTERN, Double Guard.

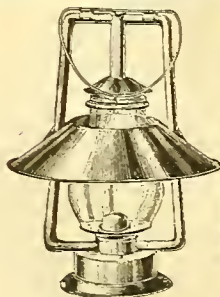


Fig. 983.  
Shade Reflector.



Fig. 984.  
Square Reflector.  
TUBULAR LANTERN.

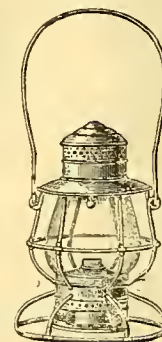


Fig. 985.  
RAILROAD LANTERN,  
"GIANT" pattern,  
with wire base and  
"Ear-bail."

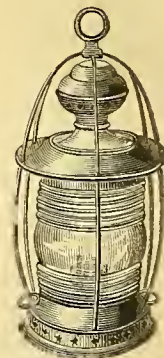


Fig. 986.  
FRESNEL  
SIGNAL LANTERN.

## LOCKS.

NAMES OF PARTS OF LOCKS; *Figs. 987-999.*

1. Door-latch Bolt.
2. Door-latch Hook.
3. Door-latch Hook-keeper.

4. Door-latch Rose.
5. Door-knob.
6. Sliding-door Handle.

7. Door-lock Bolt.
8. Door-lock Keeper.

9. Door-latch Keeper.
10. Door-latch Spindle.

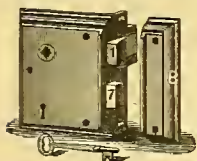


Fig. 987.  
CAR-DOOR LOCK.

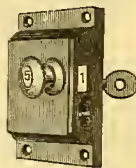


Fig. 988.  
BAGGAGE CAR-DOOR LOCK.

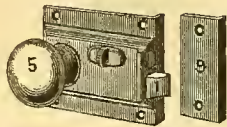


Fig. 989.  
SALOON LATCH.

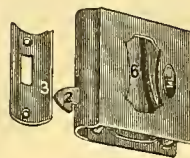


Fig. 990.  
SLIDING-DOOR LATCH.

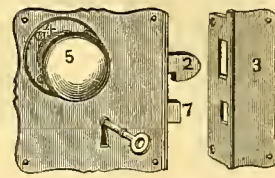


Fig. 991.  
SLIDING-DOOR LOCK.



Fig. 992.  
RIM LOCK OR DEAD LOCK.

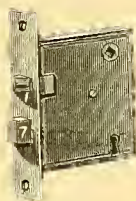


Fig. 993.  
MORTISE LOCK.

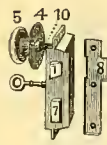


Fig. 994.  
RABBETED LOCK.

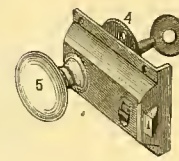


Fig. 995.  
SPRING DOOR-LATCH OR  
NIGHT-LATCH.



Fig. 997.  
CUPBOARD-CATCH OR FLUSH-BOLT.

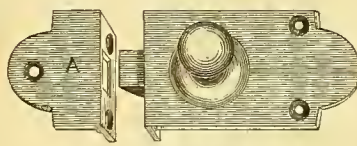


Fig. 998.  
CUPBOARD-LATCH.

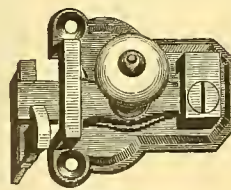


Fig. 999.  
DOOR-SPINDLE AND KNOBS.

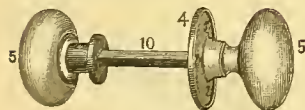


Fig. 1000. Fig. 1001.  
ESCUTCHEONS.



Fig. 1002.  
DOOR-LATCH ROSE AND  
ESCUTCHEON.

(The swinging plate which covers the key-hole in an escutcheon (as A, Fig. 1011), is also commonly called ESCUTCHEON, but more properly an ESCUTCHEON-PLATE.)

See also FURNISHINGS, DOOR.



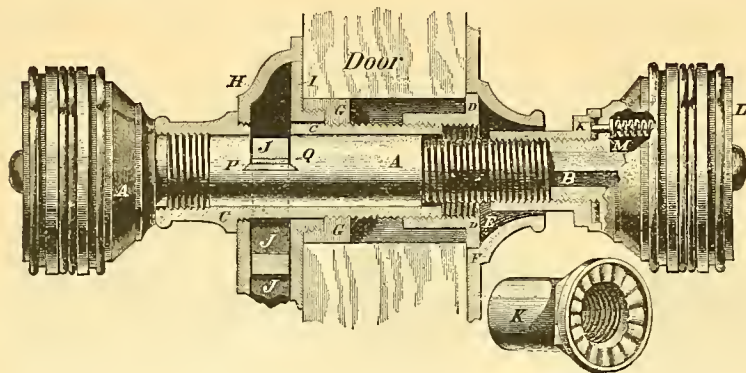


Fig. 1003.

KIRBY'S CAR-DOOR LOCK.  
(Screwless Knob and Spindle.)

Fig. 1004.

NAMES OF PARTS; Figs. 1003-1004.

- |                           |                       |                       |
|---------------------------|-----------------------|-----------------------|
| A. Inside Door-knob.      | E. } Door-latch Rose. | K. Coupling-sleeve.   |
| A'. Shank.                | F. }                  | L. Outside Knob.      |
| B. Spindle.               | G. Lock-nut.          | M. Ratchet-bolt.      |
| C. Sleeve.                | H. Inside-shell.      | P. Shank-facing.      |
| D. Outside Sleeve-collar. | I. Back-plate.        | Q. Latch-bolt facing. |
|                           | J. Latch-pull.        |                       |

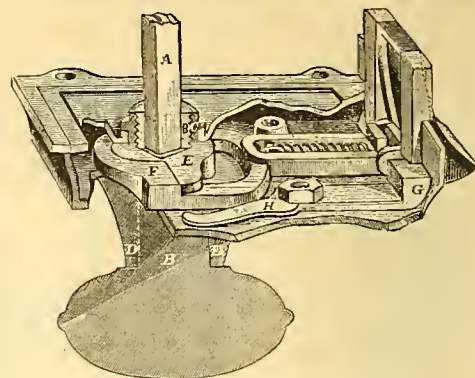


Fig. 1005.

CAR-DOOR LOCK.  
(Screwless Knob and Spindle, cheap pattern.)

NAMES OF PARTS; Fig. 1005.

- |                   |
|-------------------|
| A. Spindle.       |
| B. Door-knob.     |
| C. Flange-collar. |
| D. Sleeve.        |
| F. Yoke.          |
| G. Stop-bolt.     |

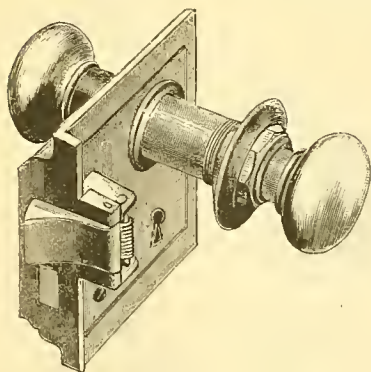


Fig. 1006.

NILES' CAR-DOOR RIM-LOCK.

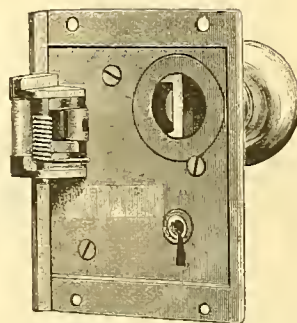


Fig. 1008. Rear View.

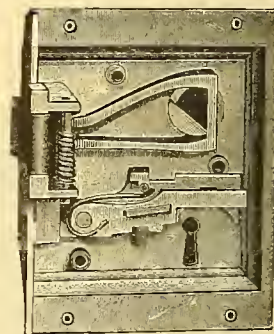


Fig. 1009. Interior View.

NILES' CAR-DOOR RIM-LOCK.



Fig. 1007.

SCREWLESS KNOB-SHANK AND KNOBS.  
For Niles' Car-door Rim-lock, Fig. 1006. See also FURNISHINGS, DOOR.

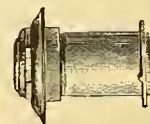
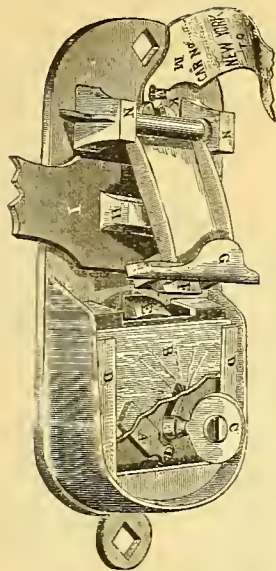


Fig. 1010. ROSE.





## NAMES OF PARTS ;

Fig. 1011.

- A. Escutcheon, or Escutcheon-plate (see Fig. 1000).
- B. Glass Seal.
- C. Key.
- D. Glass-plate Guide.
- E. Lock Bolt.
- F. Lock-bolt Catch.
- G. Clasp.
- H. Door-hasp Pin.
- I. Door-hasp.
- K. Tag-holder Clasp.
- L. Tag-holder.
- M. Tag.
- N. Lugs or Standards.

Fig. 1011. FREIGHT-CAR SEAL-LOCK.  
(Also made to be used without key, the seal only serving as a lock.)

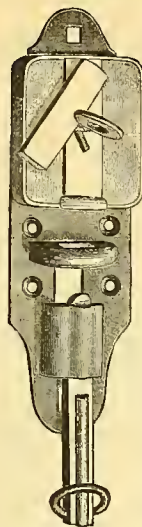


Fig. 1012.  
FREIGHT-CAR  
LOCK.



Fig. 1013.  
CHAIN BOLT,  
with SEAL.  
(Takes padlock.)

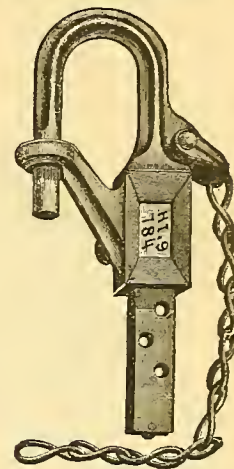


Fig. 1016.  
CHAIN LOCK FOR GLASS  
SEALS

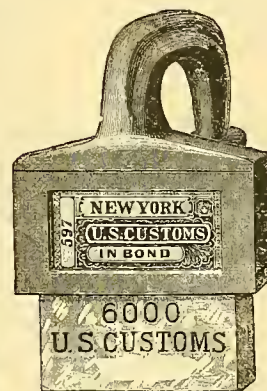


Fig. 1015.  
PAPER AND GLASS SEAL-  
HOLDER.  
(U. S. Customs.)



Fig. 1014. STATIONARY SEAL HOLDER.

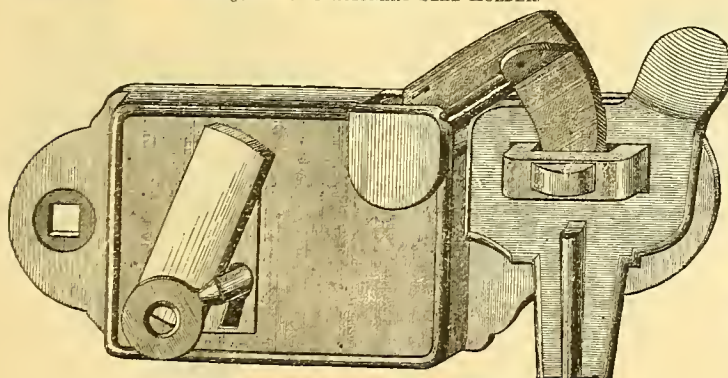


Fig. 1017. STATIONARY FREIGHT-CAR LOCK.  
(The catch that holds the hasp locks by the act of moving it to place.)

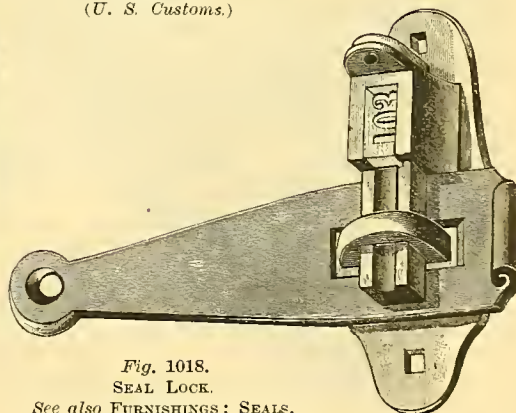


Fig. 1018.  
SEAL LOCK.  
See also FURNISHINGS; SEALS.

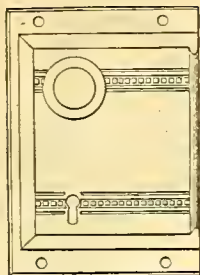


Fig. 1019.  
CAR-DOOR LOCK.  
(5 7/8 x 4 1-16 in.)



Fig. 1020.  
CAR-DOOR LOCK KEEPER.

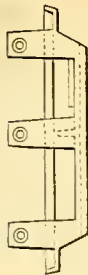


Fig. 1021.  
CAR-DOOR LOCK KEEPER.

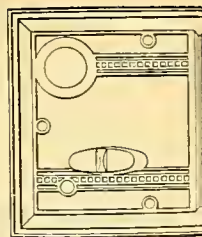


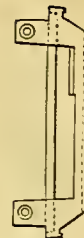
Fig. 1022.  
SALOON LOCK.  
(4 15-16 x 4 1/4 in.)



Fig. 1023.  
DOOR-KNOB.



Fig. 1024.  
SALOON-LOCK KEEPER.



Figs. 1019 to 1025. DETAILS OF PENNSYLVANIA RAILROAD STANDARD PASSENGER-CAR LOCKS.



Fig. 1025.  
CAR-DOOR  
LOCK  
ESCUTCHEON.  
(5 1/2 in. high.)

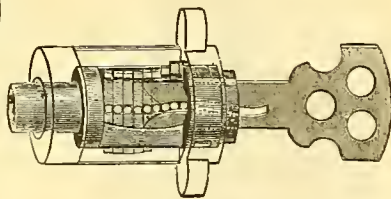


Fig. 1026.  
FOSTER RIM NIGHT-LATCH,  
showing CYLINDER, KEY and TUMBLERS.

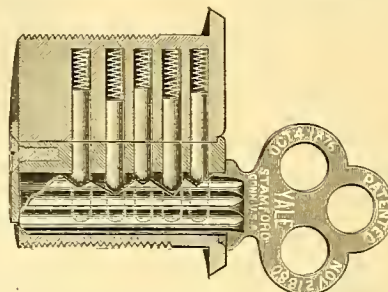


Fig. 1027.  
Section of Escutcheon.  
YALE LOCK (full size). (New Style, with CORRUGATED KEY.)

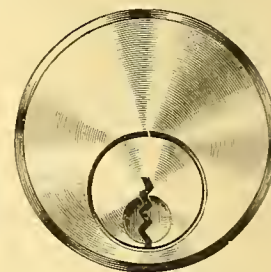


Fig. 1028.  
End View

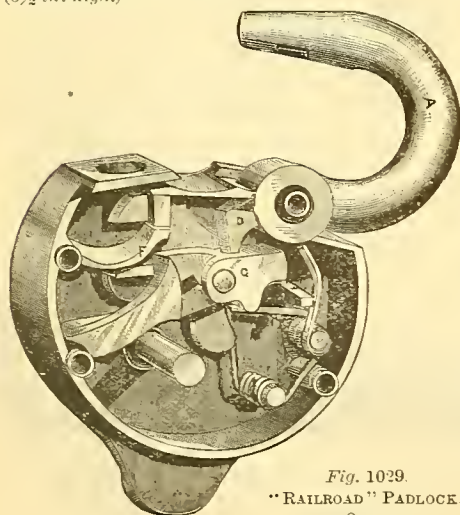


Fig. 1029.  
"RAILROAD" PADLOCK.  
Open.

NAMES OF PARTS: Figs. 1029-30.

- A. Shackle.
- B. Sliding Bolt.
- C. Tumbler.
- D. Heel, of Shackle.
- E. Bit, of Sliding Bolt.
- F. Shackle-guard.
- G. Shackle-spring.
- H. Sliding-bolt Spring.
- I. Shackle-springs.
- K. Tumbler.
- L. Key Pin.

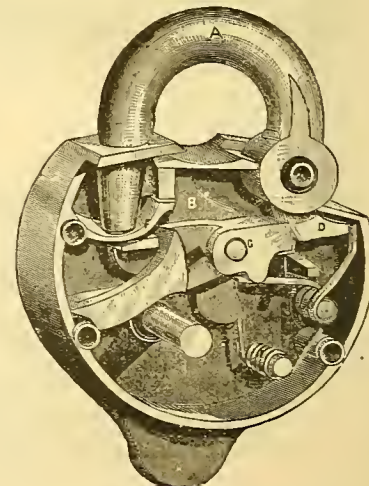


Fig. 1030. "RAILROAD" PADLOCK.  
(See next page.)



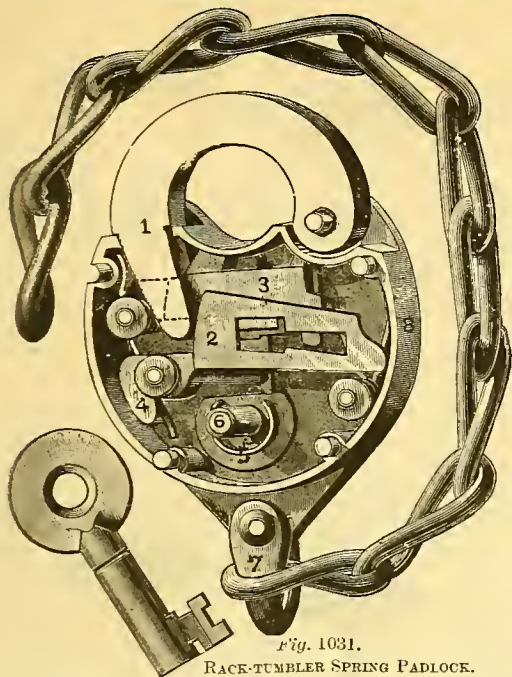


Fig. 1031.

RACE-TUMBLER SPRING PADLOCK.

- |                  |             |            |
|------------------|-------------|------------|
| 1. Shackle.      | 4. Tumbler. | 7. Clevis. |
| 2. Tumbler.      | 5. Ward.    | 8. Case.   |
| 3. Sliding Bolt. | 6. Pivot.   |            |

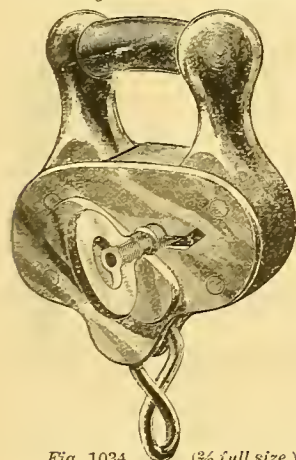
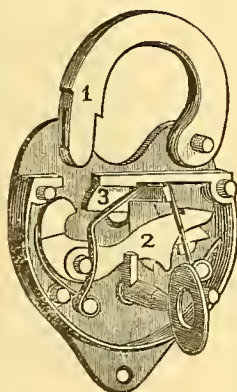
Fig. 1034. ( $\frac{3}{8}$  full size.)  
"RAILROAD" PADLOCK, BAR SHACKLE.

Fig. 1035.

"RAILROAD" PADLOCK.

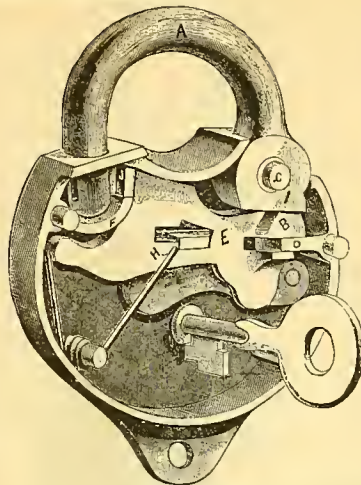
(Cheap grade, with external EARS  
for shackle.)

Fig. 1032. Closed.

( $\frac{3}{8}$  full size.)

"RAILROAD" PADLOCK.

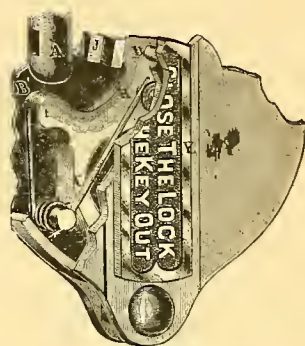


Fig. 1033.

Showing manner in which escutcheon  
drops into place.

Fig. 1036. Outside View.

MILLER'S SELF-LOCKING PADLOCK.

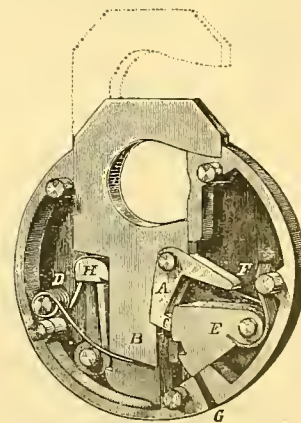


Fig. 1037. Interior View.

NAMES OF PARTS; Figs. 1036-7.

- |                    |                    |
|--------------------|--------------------|
| A. Tumbler.        | E. Tumbler.        |
| B. Shackle.        | F. Tumbler-spring. |
| C. Tumbler-dog.    | G. Key hole.       |
| D. Shackle-spring. | H. Shackle-stop.   |





Fig. 1038.  
MATCH-STRIKER.

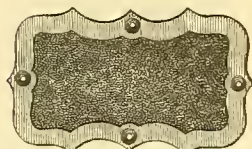


Fig. 1039.  
MATCH-STRIKER FRAME.

HAT-HOOKS of various kinds are shown in  
Figs. 1546-1552.

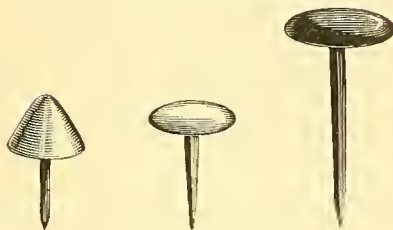


Fig. 1045.  
HEAD-LINING NAILS.  
(Full size)

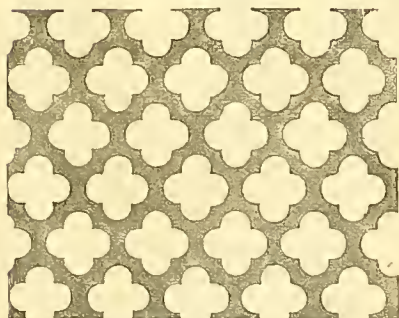


Fig. 1046.  
PERFORATED-IRON SCREEN for HEATER-ROOM  
Doors and Wash-room Panels.  
{ Usually JAPANNED. }



Fig. 1040.  
STANCHION.



Fig. 1041.  
BABCOCK FIRE-EXTINGUISHER.  
A. Acid bottle.  
B. Acid-bottle Carrier.  
Bottle-breaking  
Head shown  
above A.



Fig. 1047.  
PASSENGER-CAR THER-  
MOMETER.



Fig. 1042.  
DRAWER-PULL.

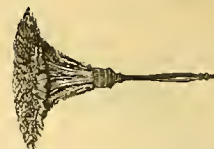


Fig. 1041.  
FEATHER DUSTER.



Fig. 1043.  
DANGER-SIGNAL and SIGNAL-HOLDER OR IGNITER.



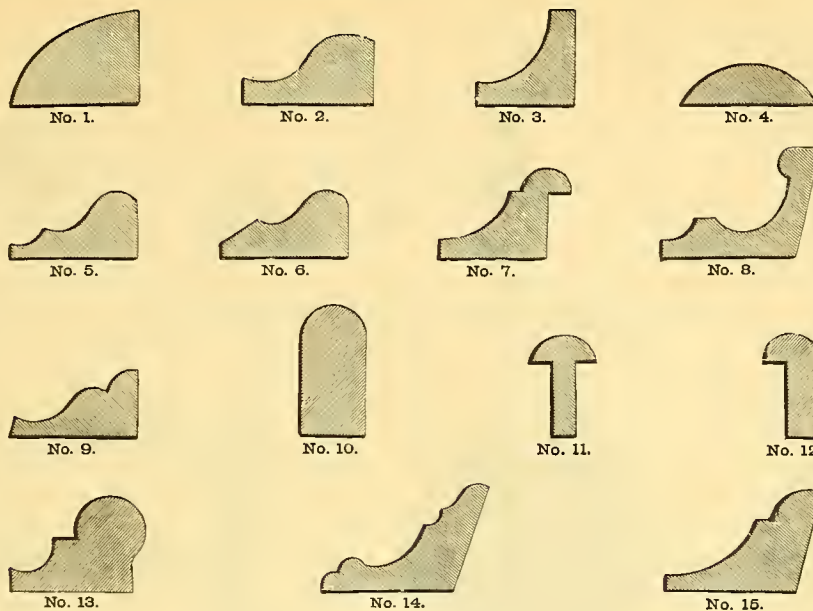
Fig. 1048.  
"PENFOLD" CARD-RACK for freight cars.  
(Attached to car-bodies as shown at 80, Fig. 93.)



Fig. 1045 1/2. SOLID-LEATHER NAILS.  
(See also FURNISHINGS; SEATS and FLOOR.)



Fig. 1049. FREIGHT-CAR CARD-RACK.  
(Malleable iron), for carrying DESTINATION CARDS.  
(Usual sizes, inside measure, 5 1/2 x 6 1/2, 7 x 9, 9 x 12  
inches. Attached to car-bodies as shown at 80, Fig. 93.)



Figs. 1050 to 1064. STANDARD FORMS OF GILT CAR MOULDINGS; made both PLAIN and WAVED.

Other sizes, and an infinite variety of other sections, are manufactured. The above are simply certain sections known to the trade as standard and usually carried in stock, with the following variations in sizes:

**No. 1.**  
 $\frac{1}{4} \times \frac{1}{4}$  in., face gilt.  
 $\frac{3}{8} \times \frac{1}{4}$  " "  
 $\frac{3}{8} \times \frac{3}{8}$  " "  
 $\frac{1}{2} \times \frac{3}{8}$  " "  
 $\frac{1}{2} \times \frac{1}{2}$  " "  
 $\frac{3}{4} \times \frac{1}{2}$  " "

**No. 2.**  
 $\frac{3}{8}$  in. base, two faces gilt.  
 $\frac{1}{2}$  " " "  
 $\frac{5}{8}$  " " "  
 $\frac{3}{4}$  " " "  
 $\frac{7}{8}$  " " "  
 $1$  " " "

**No. 3.**  
 $\frac{3}{8} \times \frac{1}{4}$  in., three faces gilt.  
 $\frac{3}{8} \times \frac{3}{8}$  " " "

**No. 4.**  
 $\frac{1}{4}$  in. base, face gilt.  
 $\frac{3}{8}$  " " "  
 $\frac{1}{2}$  " " "  
 $\frac{5}{8}$  " " "  
 $\frac{3}{4}$  " " "  
 $1$  " " "

**No. 5.**  
 $\frac{3}{8}$  in. base, face gilt.  
 $1$  " " "

**No. 6.**  
 $\frac{5}{8}$  in. base, face gilt.  
 $\frac{3}{4}$  " " "

**No. 7.**  
 $\frac{3}{4}$  in. base, face gilt.

**No. 8.**  
 $1\frac{1}{4}$  in. base, face gilt.

**No. 9.**  
 $1\frac{1}{2}$  in. base, face gilt.  
**No. 10.**  
 $1 \times \frac{3}{8}$  in., one side gilt.  
 $1 \times \frac{1}{2}$  " " "

**No. 11.**  
 $\frac{3}{8}$  in. bead, face gilt.  
 $\frac{1}{2}$  " " "

**No. 12.**  
 $\frac{3}{8}$  in. bead, face gilt.

**No. 13.**  
 $1$  in. base, all faces gilt.  
 $1\frac{1}{2}$  " " "

**No. 14.**  
 $1\frac{3}{4}$  in. base, gilt or Gr. Cen.  
 $2\frac{1}{4}$  " " " "

**No. 15.**  
 $1\frac{1}{2}$  in. base, all faces gilt.



Fig. 1065.  
CORNER WASHSTAND,  
with "PATENT OVERFLOW."  
(SIDE Washstands, or HALF-  
CIRCLE Washstands have the  
back straight; otherwise simi-  
lar to Fig. 1065)



Fig. 1066.  
SCHEME-ROD BRACKET, with screw.  
(For  $\frac{3}{4}$ -in. rod; projects 2 in.)



Fig. 1067.  
WINDOW-ROD BUSHING.

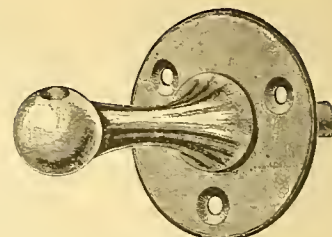


Fig. 1068.  
SCHEME-ROD BRACKET, with flange.  
( $\frac{2}{3}$  full size.)



Fig. 1069.  
CUPBOARD-CATCH  
(Latch and Keeper).  
( $\frac{2}{3}$  full size.)

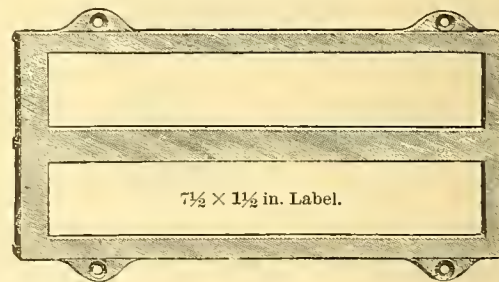


Fig. 1070.  
LABEL-HOLDER, Double.  
(Takes  $7\frac{1}{2} \times 1\frac{1}{2}$  in. card. Single Label-holders on  
following page.)



Fig. 1071. LETTER-DROP.



Fig. 1072.  
Square Eye.



Fig. 1073.  
Round Eye.

POUCH-HOOKS ( $\frac{2}{3}$  full size).

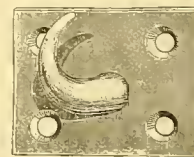


Fig. 1074.  
POUCH-HOOK, with flange.  
(Often termed ORMOLU HOOK.)  
(Half-size.)



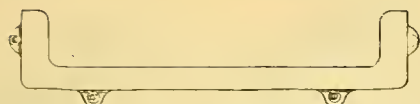


Fig. 1076. LABEL-HOLDER.



Fig. 1077.

COMBINED LABEL-HOLDER AND DRAWER PULL.

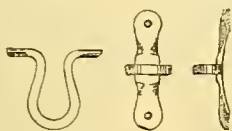
(Figs. 1076-1077 take a  $7\frac{1}{2}$ -in. card.)

Fig. 1080.

HAND-RAIL BRACKET.

( $\frac{1}{4}$  full size.)

Fig. 1078. STRAP-SHEAVE.

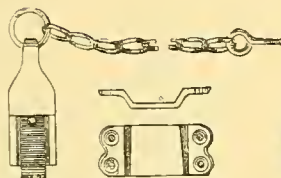


Fig. 1081.

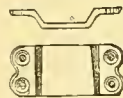


Fig. 1082.



Fig. 1083.

DOOR-BOLT AND DOOR-BOLT CLASP, with CHAIN and EYE.

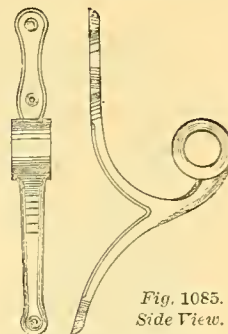


Fig. 1084.

Front View.

HAND-RAIL BRACKET.

( $\frac{1}{4}$  full size.)

Fig. 1085.

Side View.

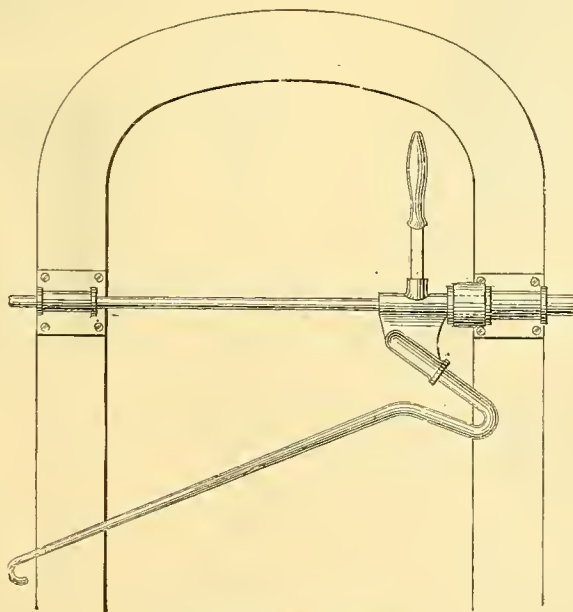


Fig. 1086. MAIL CATCHER.

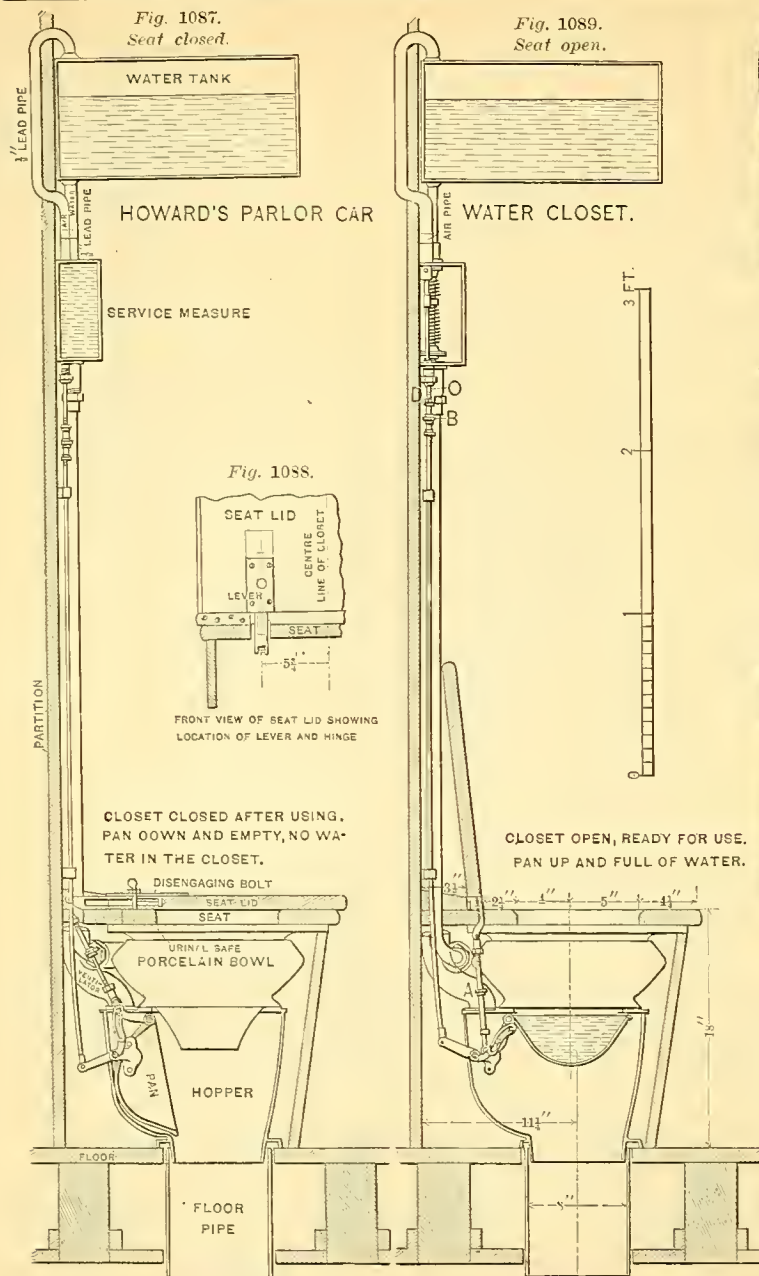


Fig. 1090.  
Oblique CLOSET-HOPPER.  
With pipe for WIND-SCOOP.

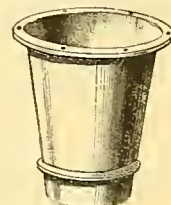


Fig. 1091.  
Coned CLOSET-HOPPER.

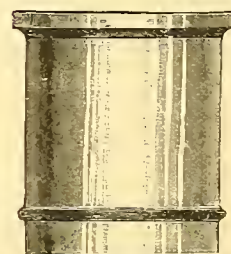


Fig. 1093.  
Straight CLOSET-HOPPER.



Fig. 1095.  
SALOON PAPER-HOOK.  
(CONTINUOUS-ROLL PAPER-  
HOLDERS are also  
largely used )

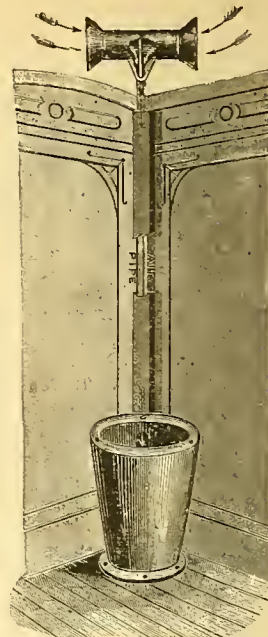


Fig. 1092.  
CLOSET-HOPPER and WIND-SCOOP.



Fig. 1094.  
SALOON VENTILATING-JACK  
OR WIND-SCOOP.

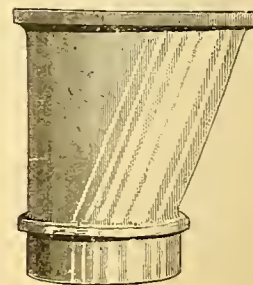


Fig. 1096.  
Sloping CLOSET-HOPPER.

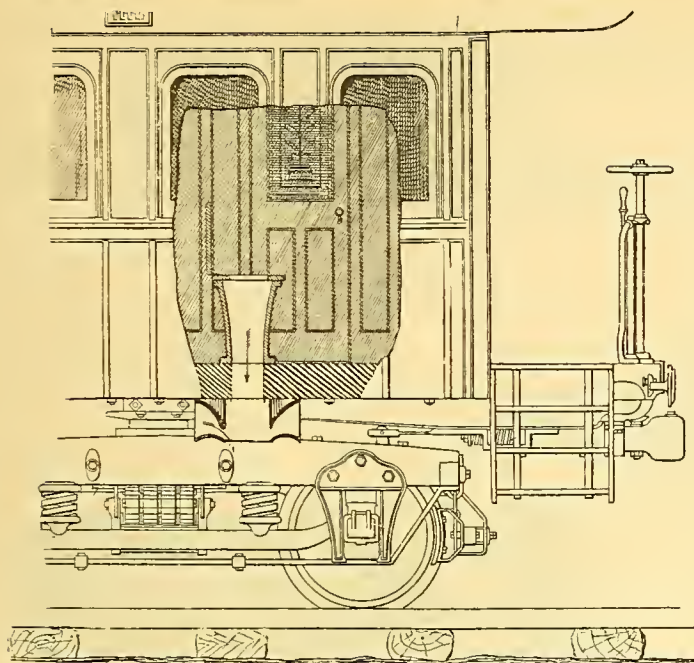


Fig. 1097. Section through Closet-hopper.  
BELL'S EXHAUST HOPPER-VENTILATOR.

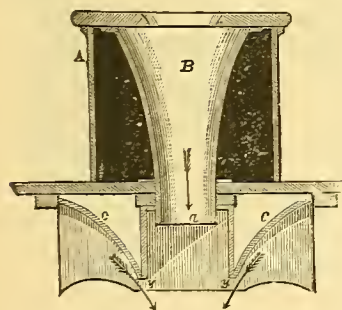


Fig. 1098. Enlarged section.  
BELL'S EXHAUST HOPPER-VENTILATOR.

A. Closet-hopper Casing.

B. Closet-hopper.

C. Cone.

y. Throat, of Ventilator.

(CONCEALING URINALS, to be opened for use by a handle at the top, and then closed up flush with the wood-work, are also in limited use, but not generally approved.)



Fig. 1099.  
SALOON NOTICE-PLATE.



Fig. 1100.  
CORNER URINAL.  
With front projection  
and ventilating-pipe.

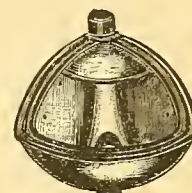


Fig. 1101.  
CORNER URINAL  
VENTILATOR.



Fig. 1102.  
VENTILATOR CAP  
for Corner Urinal.

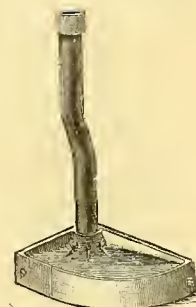


Fig. 1103.  
URINAL DRIP PAN.  
(Usual sizes, 12x12,  
15x15, 9x14,  
10x14 in.)



Fig. 1104.  
CORNER URINAL  
Plain.

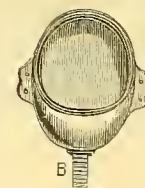


Fig. 1105.  
SIDE URINAL  
Plain.  
B. Urinal-pipe.

(SIDE URINALS are also made with the attachments shown in Figs. 1100 to 1103 for corner urinals, but side urinals are rarely used in passenger cars.)





Fig. 1106.  
SIDE URINAL-HANDLE.

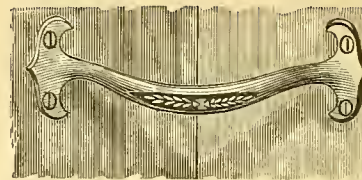


Fig. 1107.  
CORNER URINAL-HANDLE.

### FURNISHINGS; Seals and Freight-car Locks.

Additional Freight-car Locks are shown under FURNISHINGS, LOCKS.

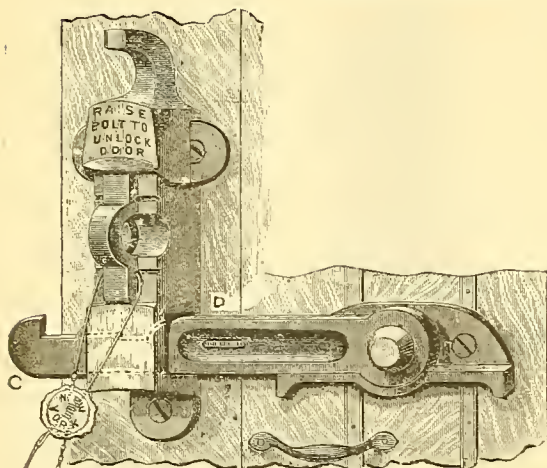


Fig. 1108. No. 1. Right-hand.

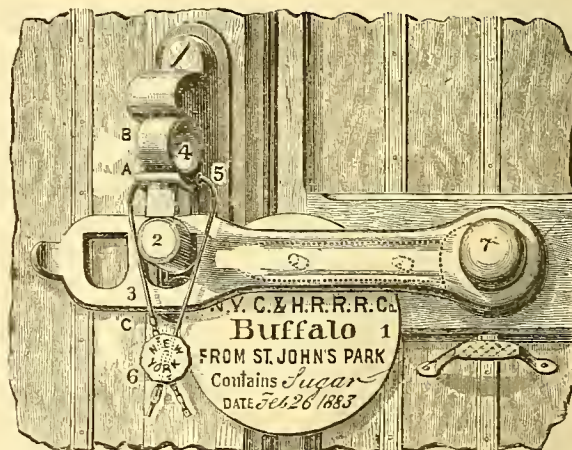


Fig. 1109. No. 3. Right-hand.

BROOKS' "STANDARD" CAR-DOOR FASTENER.  
(Made either right or left hand.)

NAMES OF PARTS, CAR-DOOR FASTENER; Figs. 1109-1111.

- A. Opening, for Seal-wire.
- B. Padlock Hasp.
- C. Second Catch.
- D. Tin Shackle-lock.

- 1. Tag.
- 2. Pin.
- 3. Hasp.
- 4. Padlock-hole.

- 5. Base.
- 6. Seal.
- 7. Pivot.



Fig. 1111. SEAL PRESS.

Fig. 1110. SEAL-HOOK.  
(Old style.)

Fig. 1112.

CAR SEALS, with LEAD RIVET-seal AND TIN PRINTED SHACKLE.  
(Crimped metal.)

Fig. 1113.

Fig. 1114.  
TIN SHACKLE AND LEAD  
SEAL, with TIN RE-  
TURN-TAG.Fig. 1115.  
SHEET METAL EYELET  
SHACKLE CAR  
SEAL.Fig. 1116.  
SIX-PLY WIRE SHACKLE  
AND LEAD CAR  
SEAL.

Fig. 1117.

CENTRAL CAST-IN CROSS-  
WISE LEAD SEAL, with  
DETECTIVE WIRE.

Fig. 1118.

TWISTED FLAT WIRE  
SHACKLE AND LEAD  
CAR-SEAL.

Fig. 1119.

TIN SHACKLE AND  
LEAD RIVET-  
SEAL.

(For Glass and other Seals see FURNISHINGS, LOCKS.)

## CAR-SEATS.

NAMES OF PARTS OF CAR-SEATS:  
FIGS. 1120-1124.

1. Seat-rail.
2. (Fig. 1120.) Seat-end, Aisle Seat-end, or Short Seat-end.
3. (Fig. 1121.) Seat-end, Long Seat-end, or Iron Seat-end.
4. Wall Seat-end.
5. Seat-end Arm.
6. Seat-stand.
7. Foot-rails (fixed).
7. (Fig. 1120.) Foot-rest (movable).
7. (Fig. 1121 ) Foot-rails (fixed).
8. Movable Foot-rest.
9. Foot-rest Carrier.
10. Heater-pipe Casing, or Side Foot-rest.
11. Seat-back.
12. Seat-back Moulding.
13. Seat-arm.
14. Seat-stop.
15. Seat-lock.
16. Arm-cap.
17. Cushion-frame.
18. Seat-spring.

(Other and more modern styles of Seat-ends are shown in the following engravings, and in Fig. 1194.)

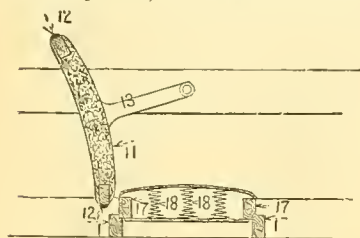


Fig. 1121. SECTION OF CAR-SEAT AND BACK.

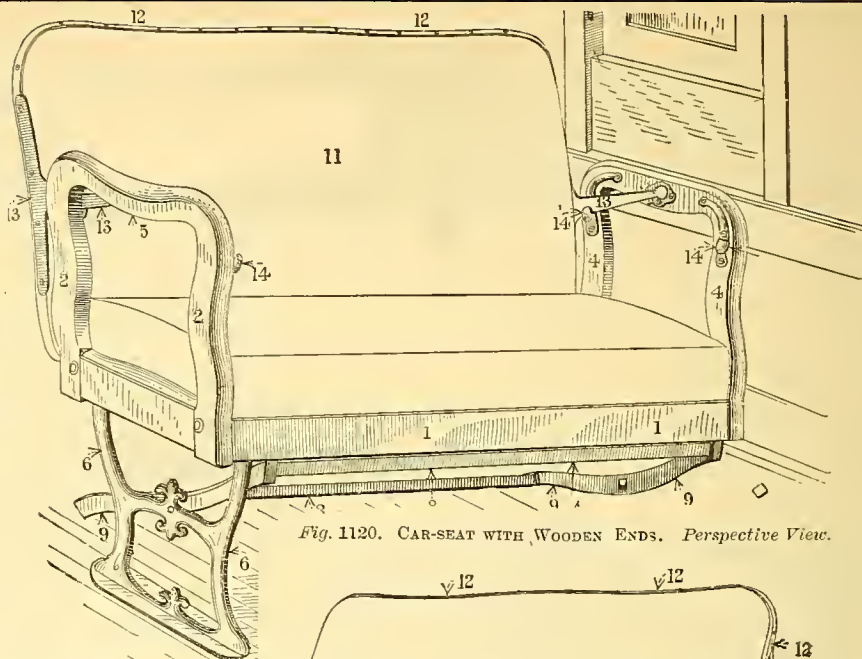


Fig. 1120. CAR-SEAT WITH WOODEN ENDS. Perspective View.

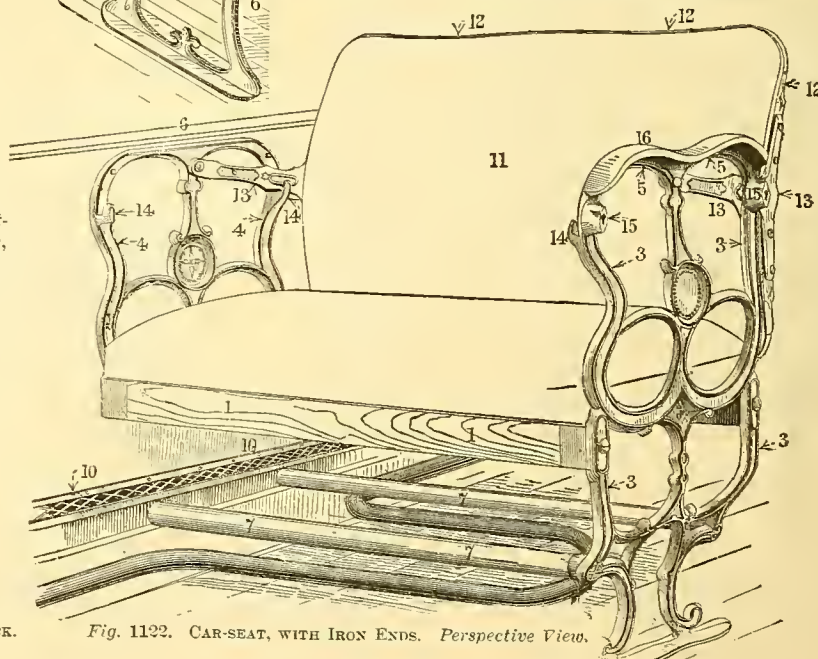
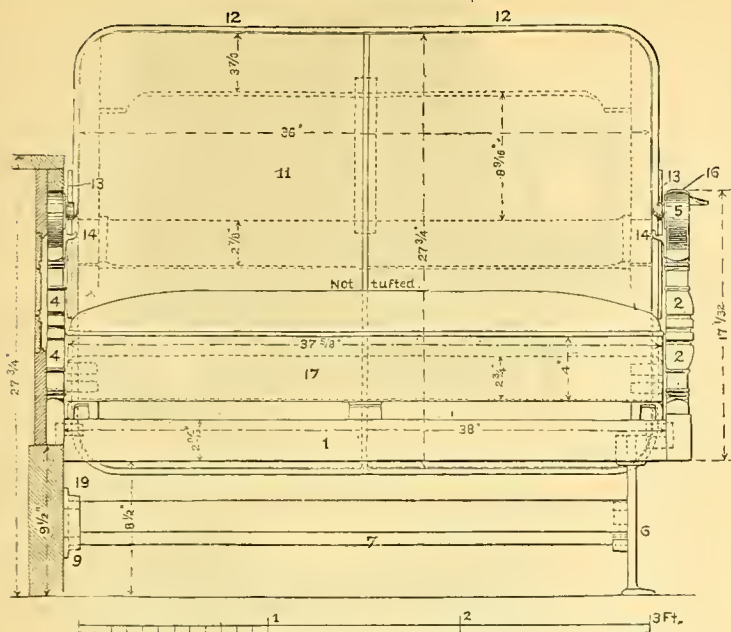


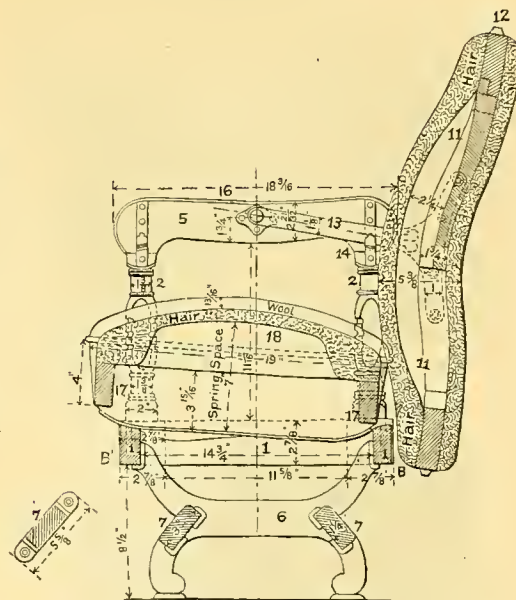
Fig. 1122. CAR-SEAT, WITH IRON ENDS. Perspective View.



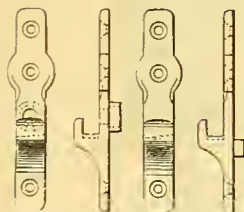


*Fig. 1123. Elevation.*

MASON ROCKER CAR-SEAT, *Pennsylvania Railroad Standard.*



*Fig. 1124. Cross Section.*



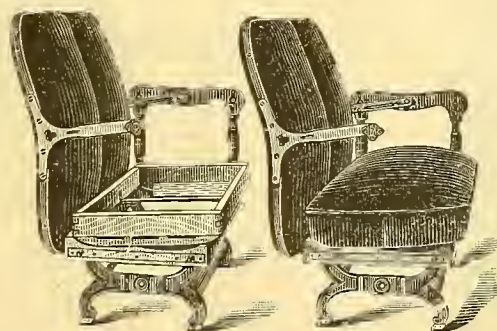
*Fig. 1125.*

*With lock.*

*Fig. 1126.*

*Without lock.*

SEAT-STOP. (4 5-16x5/8 in )



*Fig. 1127.*

*Fig. 1128.*

MASON ROCKER CAR-SEAT.

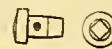
*Perspective Views.*



*Fig. 1129.*

SEAT-ARM PLATE.

(2 7-16x17/8 in.)



*Fig. 1130.*

SEAT-ARM PIVOT.

(Head,  $\frac{3}{4}$  in. diameter.)

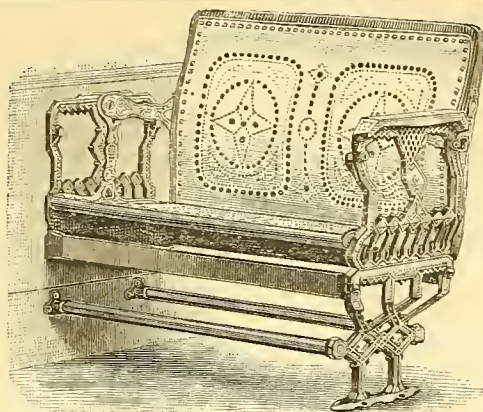


Fig. 1131. PERFORATED-VEENEER CAR SEAT, with GARDNER'S GEARED SEAT-ARM.

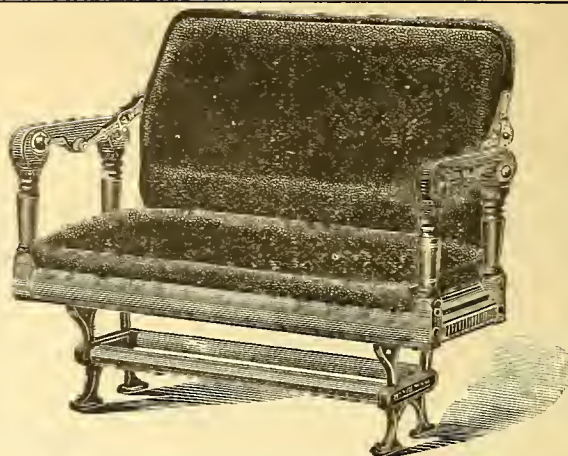


Fig. 1132. CAR-SEAT with COBB'S PIVOTED SEAT-ARM.

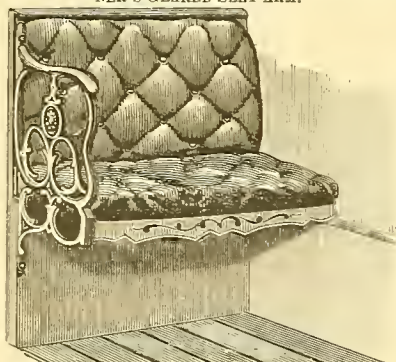


Fig. 1134. RIGHT-HAND CORNER-SEAT.

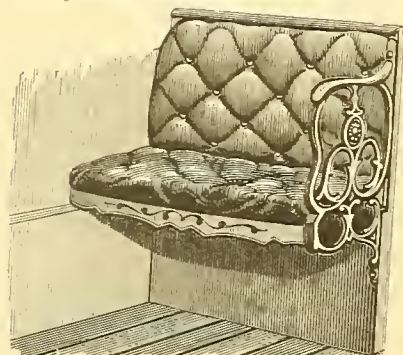


Fig. 1135. LEFT-HAND CORNER SEAT.

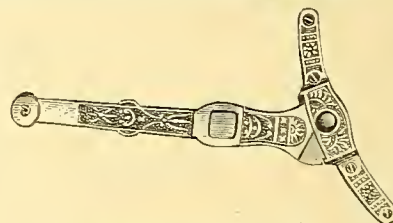


Fig. 1133. COBB'S PIVOTED SEAT-ARM.

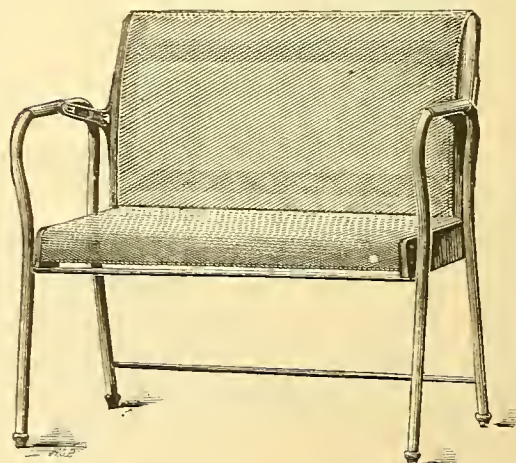


Fig. 1136. WOVEN-WIRE ALL-IRON CAR-SEAT.



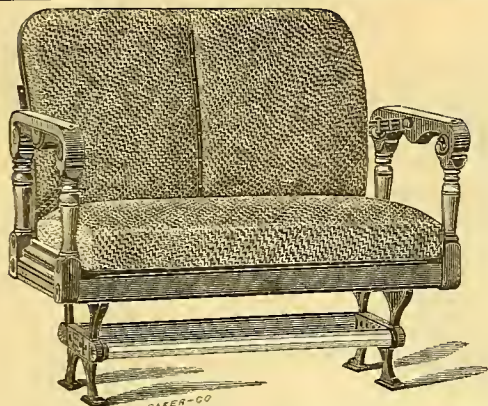


Fig. 1137. RATTAN CAR-SEAT, "Pullman Standard."

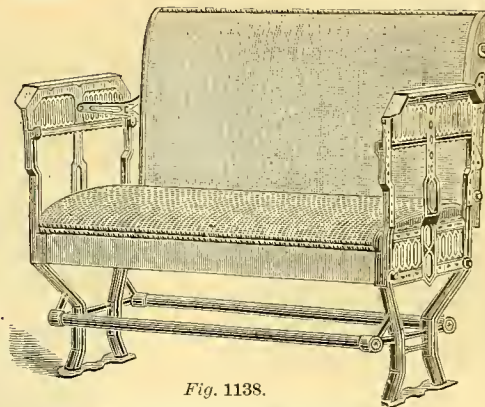


Fig. 1138.

WOVEN-WIRE CAR-SEAT, with springs.

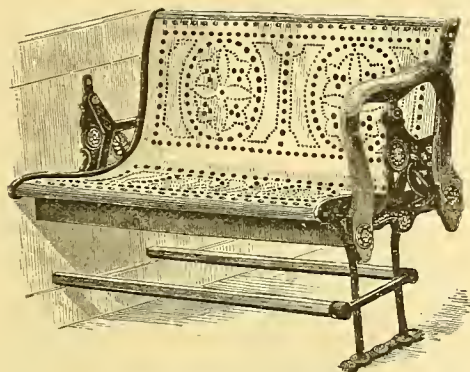


Fig. 1139. PERFORATED-VENEER CAR-SEAT, with BUNTIN'S SEAT-ENDS.

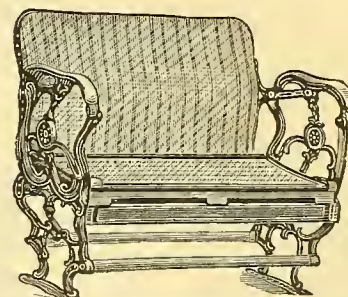
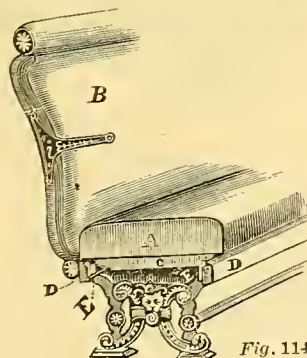


Fig. 1139½.

RATTAN CAR-SEAT, without springs.



NAMES OF PARTS; Figs. 1140-1141.

- A. Cushion.
- B. Seat Back.
- C. Track for Rollers.
- D D. Seat-rails.
- E E. Rollers.

ADJUSTABLE ROLLER CAR-SEAT.

Fig. 1140. Perspective View.

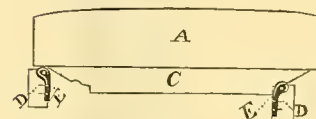


Fig. 1141. Section.



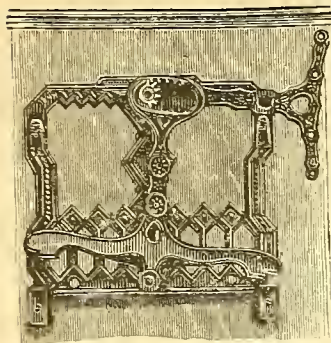


Fig. 1142.  
GARDNER'S GEARED SEAT ARM, with face  
of Seat-arm removed, showing  
RACK, PINION, ROCKER  
and ROCKER PIVOT.

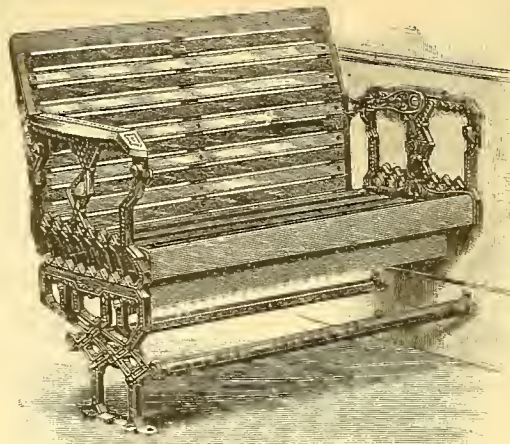


Fig. 1143.  
EMIGRANT CAR-SEAT, with GARDNER'S GEARED SEAT-ARM.

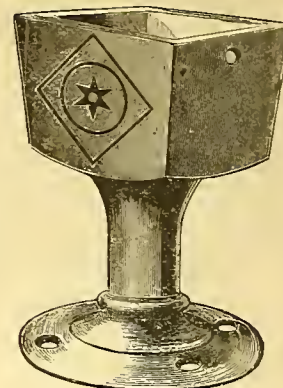


Fig. 1145.  
CHAIR-LEG FIXED CASTER.  
( $\frac{2}{3}$  full size.)

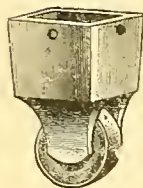


Fig. 1146.  
SOFA CASTER, with fixed roller.



Fig. 1147.  
CHAIR CASTER, with pivoted roller.

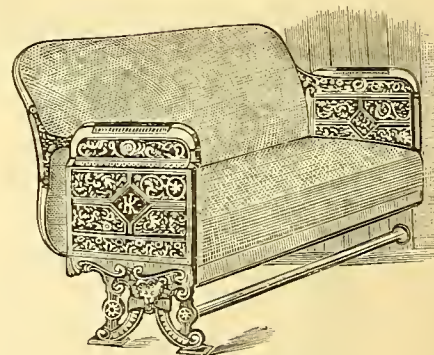


Fig. 1144.  
RATTAN SPRING-EDGE CAR-SEAT.  
(Canvas-lined Rattan.)



Fig. 1148.  
RIGID CASTER OR SOCKET.

(By custom of the trade furnishings like Figs. 1145 and 1148 are termed CASTERS, although they are, strictly speaking, not such; not having any rollers. The same is true of Fig. 1545, Table caster.)



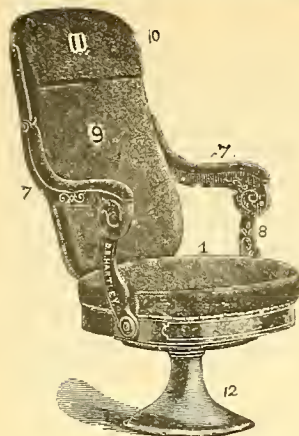


Fig. 1154.

HARTLEY RECLINING CHAIR.  
(Without Foot-rests.)

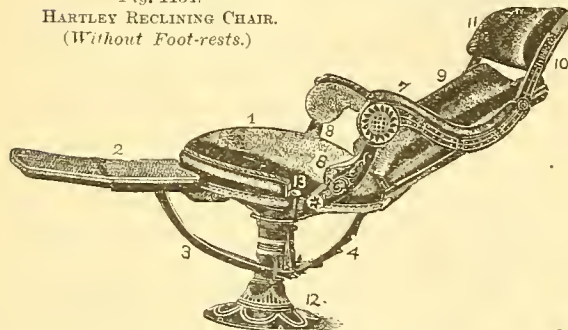


Fig. 1156.

HARTLEY RECLINING CHAIR. (Without Rear Foot-rest.)

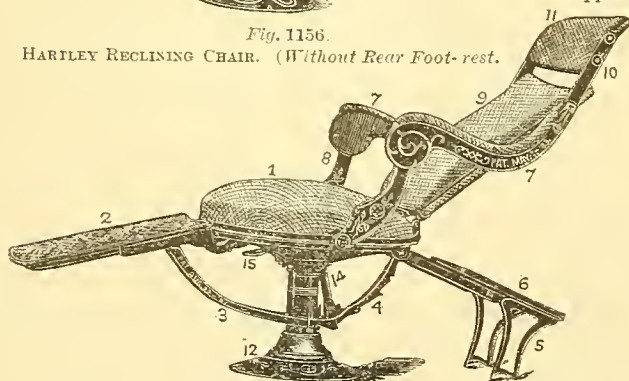


Fig. 1157.

Reclining Position.

HARTLEY RECLINING CHAIR, RATTAN UPHOLSTERY.

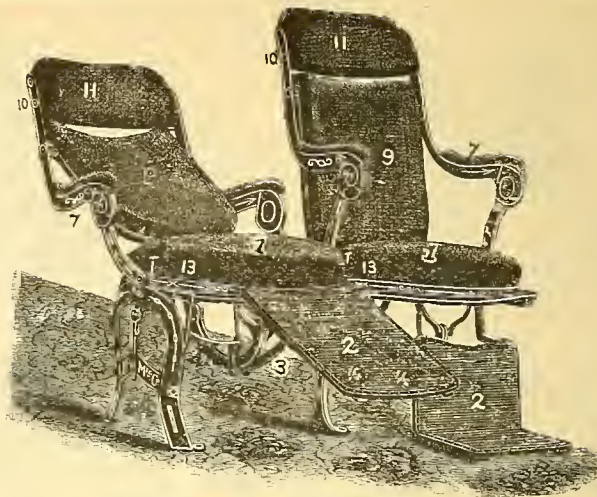


Fig. 1155. HARTLEY DOUBLE CHAIR.

8. Rock-shaft Arms (right- and left-hand), attached to Rock-shaft (not shown).
9. Chair-back.
10. Head-rest Carrier (right- and left-hand) regulated by a Thumb-lever at the side.

(Right- and left-hand are supposed to be as for a man sitting in the chair.)

11. Head-rest.
12. Pedestal: consisting of Base, Column and Seat-frame.
13. Chair-back Latch.
14. (Obsolete.)
15. Adjusting-lever.

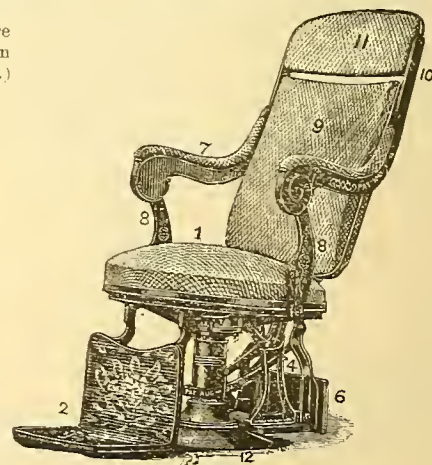


Fig. 1158. Upright Position.



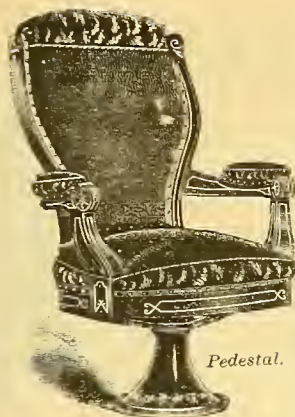


Fig. 1159.  
PARLOR-CAR REVOLVING CHAIR.  
(Plush Upholstery.)

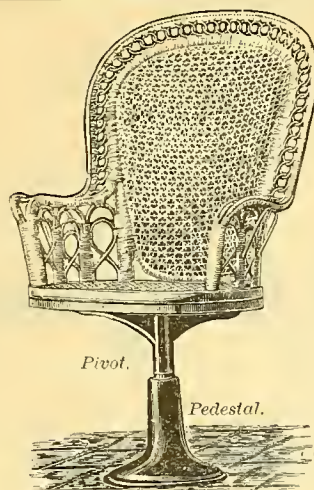


Fig. 1160.  
PARLOR-CAR REVOLVING CHAIR.  
(“Canvas-back” Pattern.)

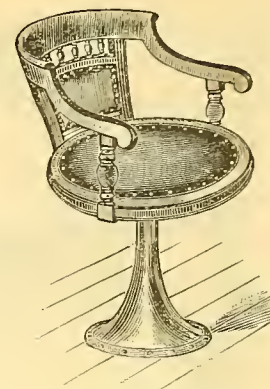


Fig. 1161.  
PARLOR-CAR SMOKING CHAIR,  
with RATTAN OR CANE SEAT.



Fig. 1162.

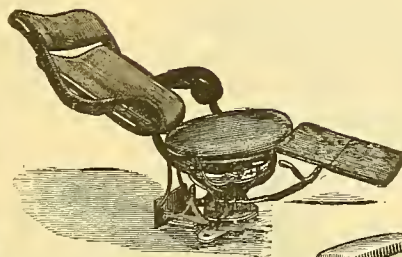


Fig. 1163.

(Names of the principal parts are substantially the same as for the HARTLEY Chairs on preceding page.)



Fig. 1164.

OTTOMAN  
FOOT-REST.

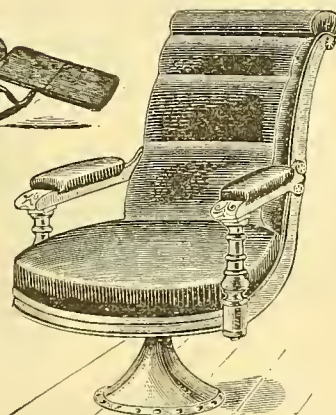


Fig. 1165.  
PARLOR-CAR CHAIR.  
(Detachable back and seat.)

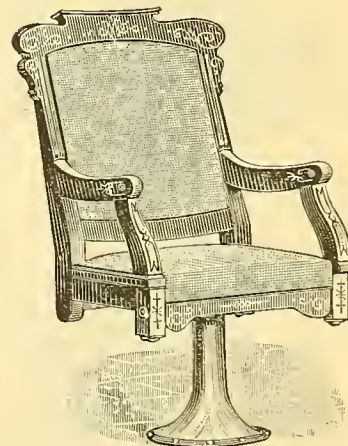


Fig. 1166.  
PARLOR-CAR CHAIR, with “SPRING-  
EDGE” CANE SEAT.



Fig. 1167. SEAT-ARM PIVOT.



Fig. 1168. SOLID-NIPPLE SEAT-ARM PIVOT,  
for wooden seat-ends.



Fig. 1169. SOLID-NIPPLE SEAT-ARM PIVOT,  
for iron seat-ends.

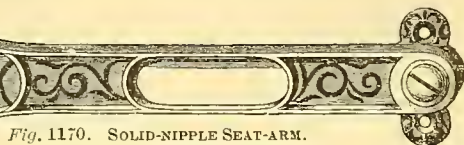


Fig. 1170. SOLID-NIPPLE SEAT-ARM.  
(Creamer's patent.)

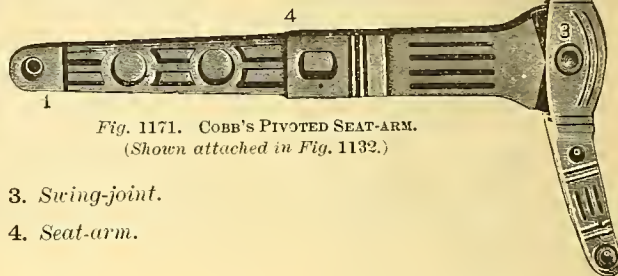


Fig. 1171. COBB'S PIVOTED SEAT-ARM.  
(Shown attached in Fig. 1132.)

1. Seat-arm Pivot. 3. Swing-joint.  
2. Seat-arm Rocker. 4. Seat-arm.

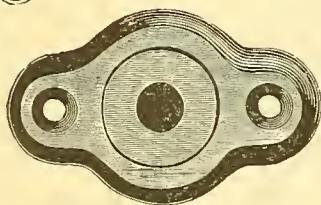


Fig. 1172. SEAT-ARM PIVOT-PLATE.

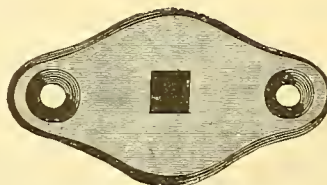


Fig. 1173. SEAT-ARM PIVOT-PLATE.

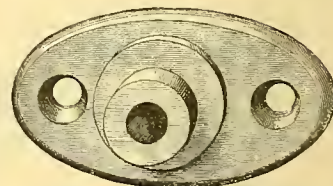


Fig. 1174. SEAT-ARM PIVOT-PLATE,  
with solid nipple.



Fig. 1175. SEAT-ARM WASHER.

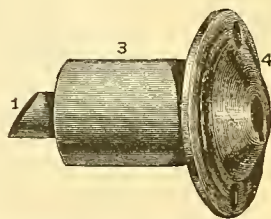


Fig. 1176. SEAT-LOCK. (Penna. R. R. Standard.)



Fig. 1178. SEAT LOCK KEY.  
( $\frac{3}{4}$  full size.)  
(Same Key is made with only  
one BIT.)

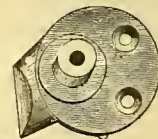


Fig. 1179. ECCENTRIC PIVOT-PLATE.

1. Bolt, for seat lock.  
2. Bolt spring, " "  
3. Barrel, " "  
4. Escutcheon, " "  
5. Bolt stop, " "



Fig. 1177. SEAT-LOCK BOLT AND SPRING. (Penna. Railroad Standard.)

(Other details of this kind are shown in Figs. 1129-1130.)





Fig. 1180.

CURVED SEAT-STOP, with LOCK.



Fig. 1181.

CURVED SEAT-STOP.

(Made right and left hand.)

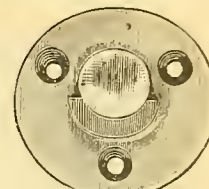
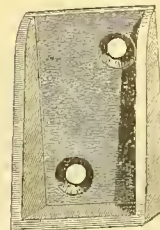
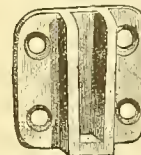
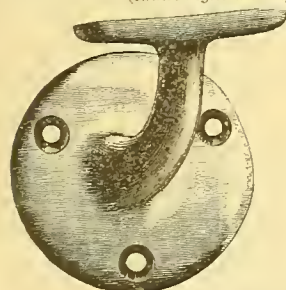
Fig. 1182.  
SEAT-STOP.Fig. 1183.  
ROUND SEAT-STOP.Fig. 1184.  
ROUND SEAT-STOP.Fig. 1187. SEAT-RAIL BRACKET,  
for wooden seat-rail.Fig. 1188. SEAT-RAIL BRACKET,  
for iron seat-rail.

Fig. 1185. ARM-REST BRACKET.

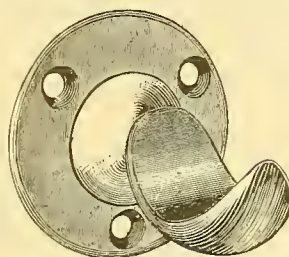


Fig. 1186. ARM-REST BRACKET.

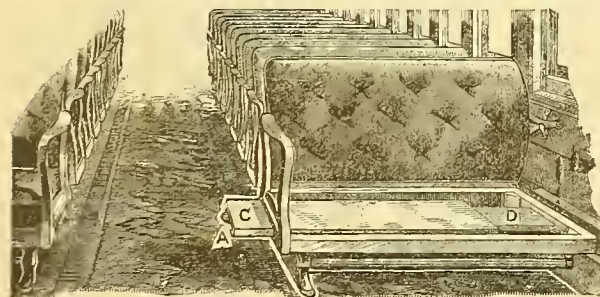


Fig. 1190. For Wooden Seat-ends.

A. Tenon.

C. Slide.

D. Guide-bar.

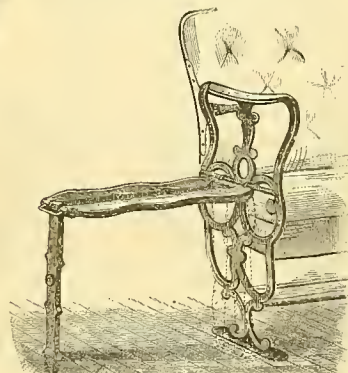


Fig. 1191. For Iron Seat-ends.

Fig. 1189.  
SEAT-JOINT BOLT.  
(For fastening seat-rail (1, Fig. 1122) to iron seat-ends. Also used at wall end.)





Fig. 1192.  
RIGHT-HAND SEAT-END.

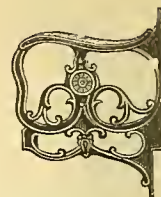


Fig. 1193.  
LEFT-HAND SEAT-END.



Fig. 1195.  
CHAIR-ARM PLATE.

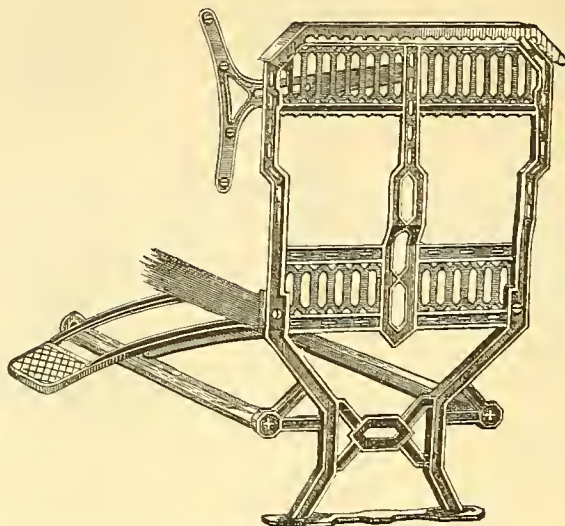


Fig. 1194.  
SEAT FRAME, "QUEEN ANNE" style, with adjustable sliding  
FOOT-REST, moving on RABBIT-PIECES.



Fig. 1197.  
ARM-CAP (15 × 1 7/8 in.).



Fig. 1196.  
SEAT-LEG PLATE.



Fig. 1198.  
ARM-CAP (14 1/2 × 1 in.).



Fig. 1199.  
3/8 in.



Fig. 1200.  
5/8 in.



Fig. 1201.  
5/8 in.



Fig. 1202.  
3/4 in.



Fig. 1203.  
3/4 in.



Fig. 1204.  
7/8 in.

CAR-SEAT MOULDINGS.  
Nos. 0, 2 and 5, PLAIN mouldings. Nos. 1, 3 and 4, BEADED mouldings.

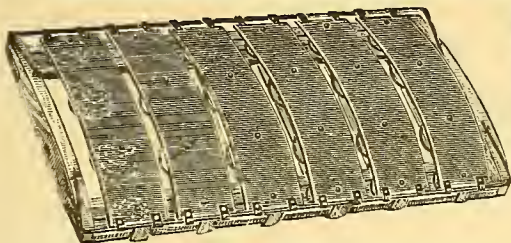


Fig. 1205. "FLEXIBLE-TOP" SPRING-EDGE SEAT-CUSHION.

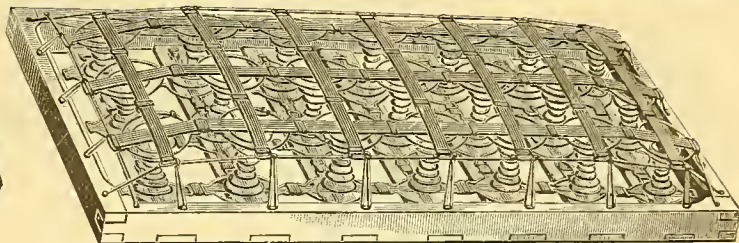


Fig. 1206. BUSHNELL CUSHION-FRAME AND SPIRAL SEAT-SPRINGS.

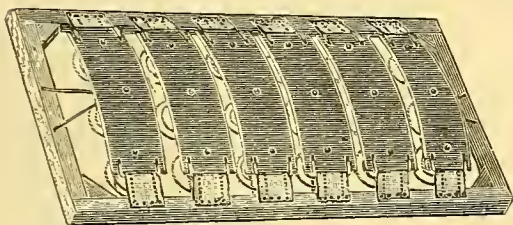


Fig. 1207. "FLEXIBLE-TOP" SPIRAL-SPRING SEAT-CUSHION, with WEBBING ENDS.

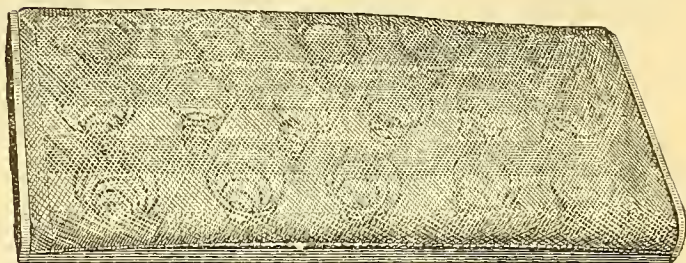


Fig. 1208. WOVEN WIRE SEAT-CUSHION, with SEAT-SPRINGS.

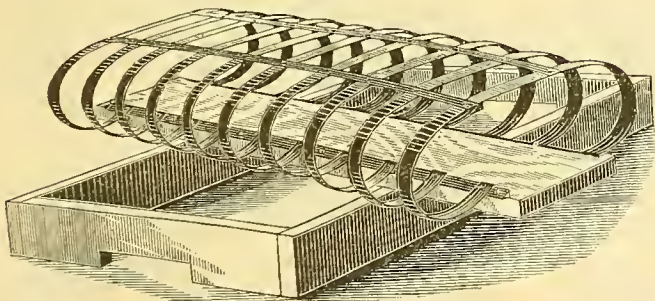


Fig. 1209. ELLIPTIC SEAT-SPRINGS AND CUSHION-FRAME.

(A BROAD-BAND Elliptic Seat-spring attached to six slats as in Figs. 1205 and 1207, each carrying four flat elliptic bands, is also manufactured.)

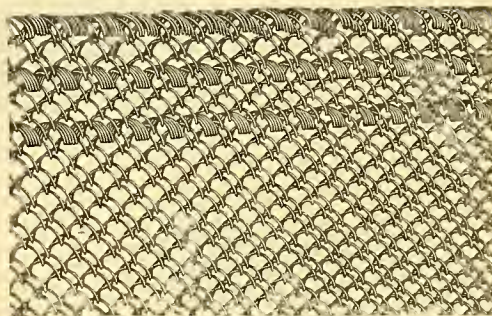


Fig. 1210. WOVEN-WIRE SEAT-COVERING.

(Showing covering used in Fig. 1208 to about half-size. Standard sizes are about  $2\frac{1}{2}$ , 3 and 5 meshes per inch.)



Fig. 1211. RATTAN OR CANE (CANVAS-LINED) SEAT-CUSHION, without Springs.





Fig. 1212. SPRING-EDGE SEAT-CUSHION, with SLATTED FLEXIBLE TOP and STEEL CROSS-PIECES.

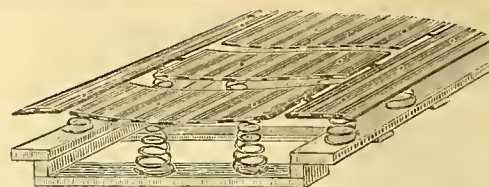


Fig. 1213. SPRING-EDGE SEAT-CUSHION, with DROP-DOWN FRAME.

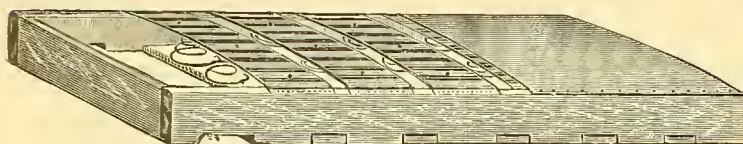


Fig. 1214. "SECTIONAL" SEAT-CUSHION.

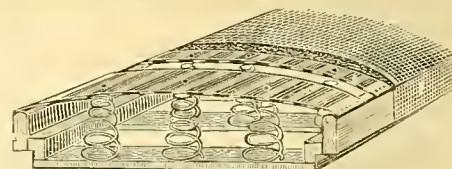


Fig. 1215. "SECTIONAL" SEAT-CUSHION, with DROP-DOWN FRAME.

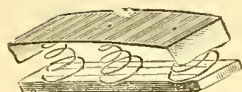


Fig. 1216.  
"Section" detached of Fig.  
1214.

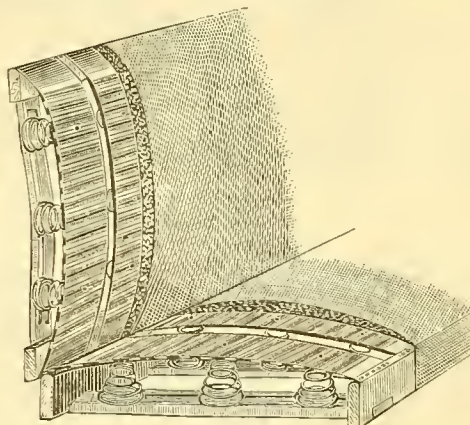


Fig. 1217.

RATTAN OR CANE "SECTIONAL" SEAT AND  
BACK; for SIDE-SEATS of Street  
and Suburban Cars.

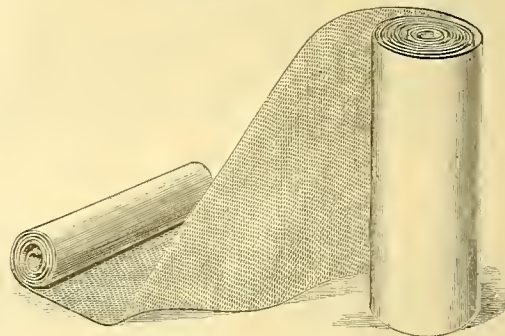


Fig. 1218. RATTAN OR CANE CANVAS-LINED SEATING.

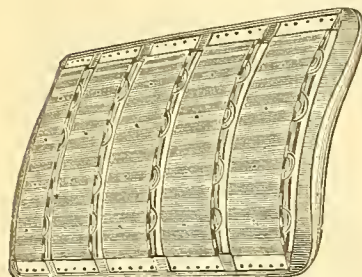


Fig. 1219. "SECTIONAL" SPRING SEAT-BACK.  
(Similar seat-backs are also made with the  
sections running horizontally.)



Fig. 1220.  
"Section" detached of Fig. 1219.

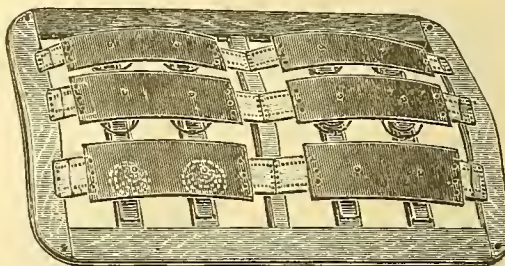


Fig. 1221. "FLEXIBLE-TOP" SPRING SEAT-BACK.

(Spring seat-backs are fitted with a special type of light spiral  
springs, known as BACK-SPRINGS.)





Fig. 1222.  
COBB'S "SECTIONAL" ELLIPTIC SPRING SEAT-CUSHION.



Fig. 1223.  
Section, detached, of Fig. 1222.



Fig. 1224.  
BROAD-BAND ELLIPTIC SEAT-SPRING.



Fig. 1225.  
FELT-EDGE (for finishing the upholstery of car-seats).

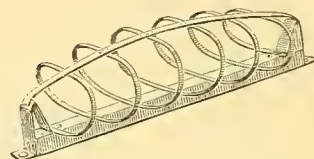


Fig. 1226.  
SPIRAL-ELLIPTIC SEAT-SPRING.



Fig. 1227.  
SPIRAL SEAT-SPRING.

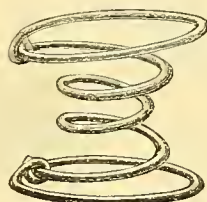


Fig. 1228.  
KNOTTED SPIRAL SEAT-SPRING.

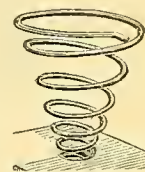


Fig. 1229.  
"EUREKA" SPIRAL SEAT-SPRING.



a.



b.



c.



d.



e.



f.

Fig. 1230. SOLID-LEATHER NAILS AND BUTTONS.

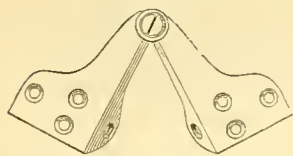


Fig. 1231.  
SEAT-HINGE.

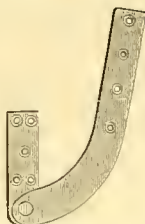


Fig. 1232.  
SOFA-HINGE.



Fig. 1233.  
BERTH-NUMBER.



Fig. 1234.  
UPPER BERTH-REST PIVOT.



Fig. 1235.  
UPPER-BERTH REST.

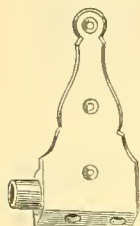


Fig. 1237.  
LOOSE BERTH-HINGE.

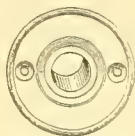


Fig. 1238.  
LOOSE BERTH-HINGE BUSHING.

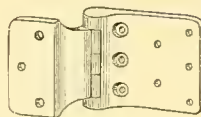


Fig. 1239.  
FAST BERTH-HINGE.

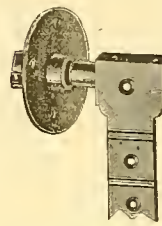


Fig. 1240.  
FOGG'S UPPER-BERTH HINGE.

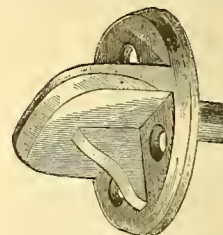


Fig. 1236.  
UPPER-BERTH BRACKET.

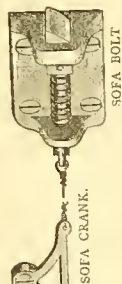


Fig. 1241.  
SOFA-PULL, SOFA-CRANK  
and SOFA-BOLT.



Fig. 1242.  
SOFA-BOLT KEEPER OR  
STRIKE-PLATE.



Fig. 1243.  
SEAT-PULL.

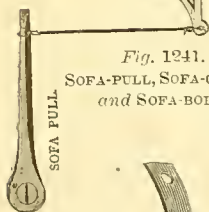


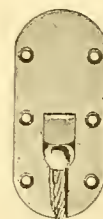
Fig. 1245.  
SEAT-LEG PLATE.



Fig. 1246.  
BERTH  
SAFETY-ROPE  
FASTENER.  
Front View.



SAFETY-  
ROPE  
FASTENER.



SAFETY-  
ROPE  
HOLDER.

Fig. 1247. BERTH SAFETY-ROPE.  
(Figs. 1246-7 are shown in use at 11, Fig. 676.)

(Since the introduction of BERTH SAFETY-LATCHES, Figs. 1261-1264, the use of Berth Safety-ropes is decreasing.)

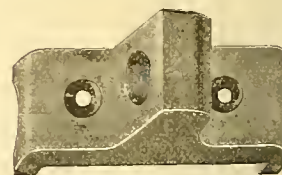


Fig. 1244.  
UPPER-BERTH REST.

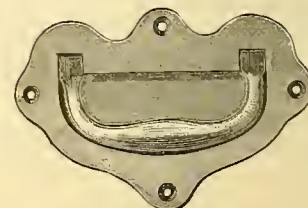


Fig. 1248.  
SEAT-PULL.

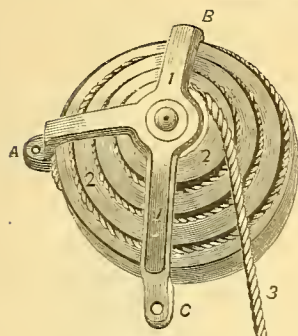


Fig. 1249.  
BERTH-SPRING.

1. Berth-spring Frame.
2. Berth-spring Fusee.
3. Berth-spring Rope.

(Instead of the Rope, 3, a PITCH CHAIN is sometimes used.)

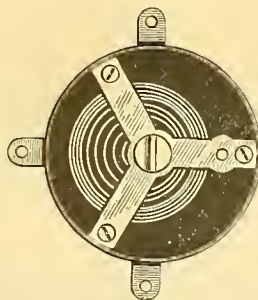


Fig. 1251.  
BERTH-SPRING.  
Back View.

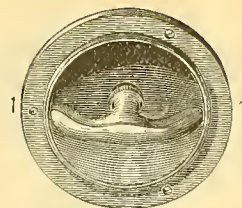


Fig. 1252.  
BERTH-LATCH HANDLE.  
1. Berth-latch Face-plate.



Fig. 1253.  
BERTH-LATCH BOLT.



Fig. 1254.  
BERTH-LATCH KEEPER OR  
STRIKE-PLATE.



Fig. 1250.  
BERTH-SPRING LUG OR CLIP.

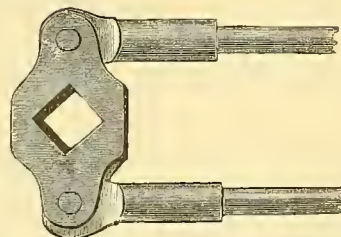


Fig. 1255.  
BERTH-LATCH LEVER.  
(Operated by the BERTH-LATCH  
HANDLE, Fig. 1252.)

(The berth-latch attachments here shown are becoming obsolete in favor of those on the following page.)



Fig. 1256.  
MIRROR AND MIRROR SASH.  
(Used between windows in Fig. 678.)



Fig. 1257.  
MIRROR-SASH HOLDER.

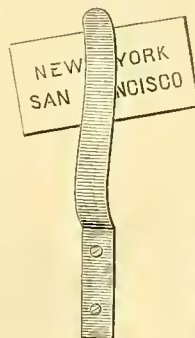


Fig. 1258.  
TICKET-HOLDER.  
(obsolete.)

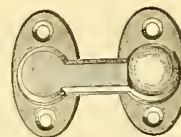


Fig. 1260.  
CUPBOARD-CATCH





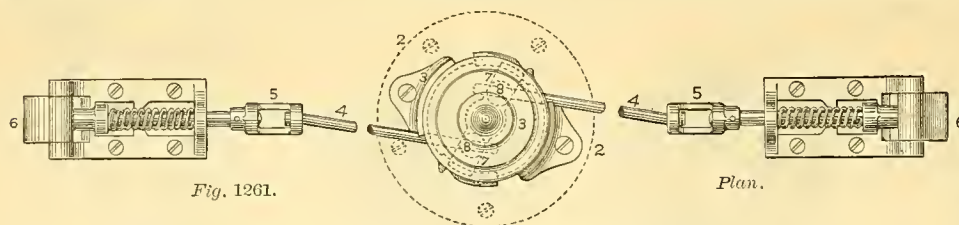


Fig. 1261.

Plan.

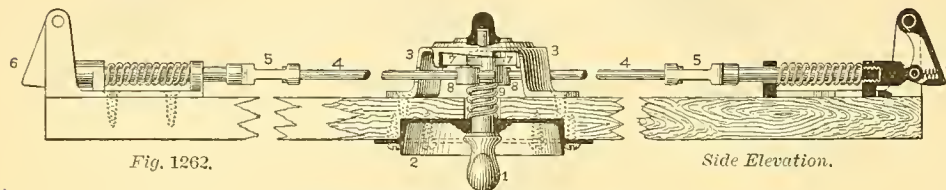


Fig. 1262.

Side Elevation.

HOWARD SAFETY BERTH-LATCH.

(Bolt released by pulling the handle out.)

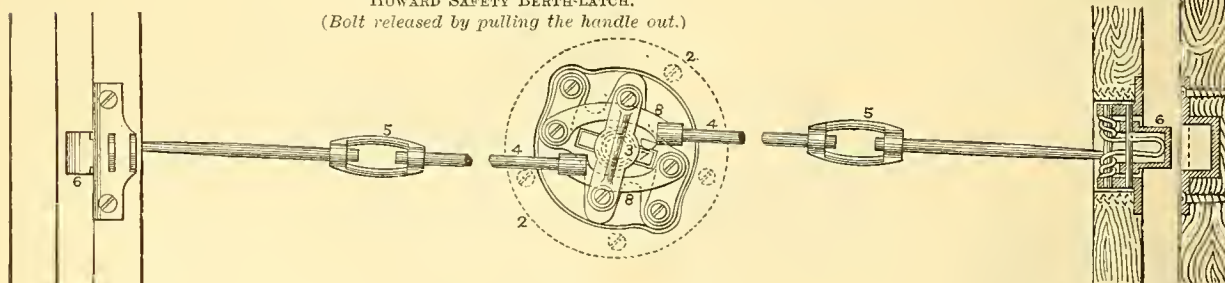


Fig. 1263. Plan.

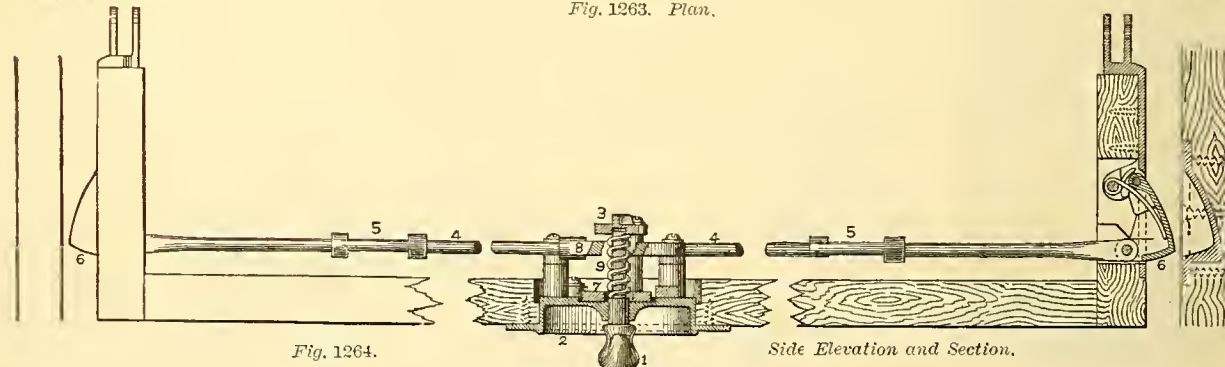


Fig. 1264.

Side Elevation and Section.

DAYTON SAFETY BERTH-LATCH.

(Bolt released by pushing the handle in.)

NAMES OF PARTS;

Figs. 1261-1264.

1. Berth-latch Handle.
2. Berth-latch Face-plate.
3. Berth-latch Back-plate.
4. Berth-latch Connecting-rod.
5. Berth-latch Turn-buckle.
6. Berth-latch Bolt, Bolt-plate and Bolt-spring.
7. Berth-latch Safety-catch.
8. Berth-latch Rocker-arm.
9. Berth-latch Safety-spring.



Fig. 1265.  
BERTH CURTAIN ROD  
HANGER.



Fig. 1266.  
BERTH CURTAIN-HOOK.



Fig. 1267.  
BERTH CURTAIN-ROD BOLT.  
(See Figs. 1265 and 1271.)



Fig. 1268.  
BERTH  
CURTAIN-HOOK.

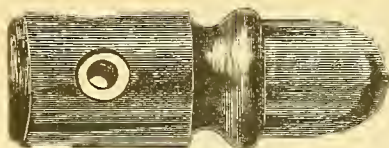


Fig. 1269.  
BERTH CURTAIN-ROD ACORN.

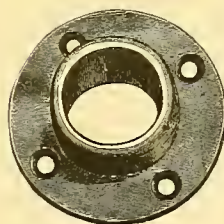


Fig. 1270.  
BERTH CURTAIN-ROD BUSHING OR SOCKET.  
(Made for 1 in. and 1 1/4 in. rods.)

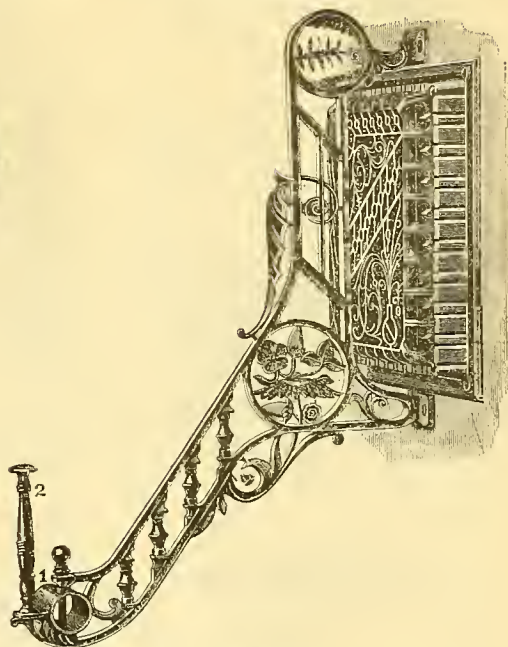


Fig. 1272.  
COMBINED VENTILATING REGISTER AND BERTH CURTAIN-  
ROD BRACKET.  
1. Berth Curtain-rod Coupling.  
2. Hat-post.  
(For other Ventilators, see Figs. 1553-69.)

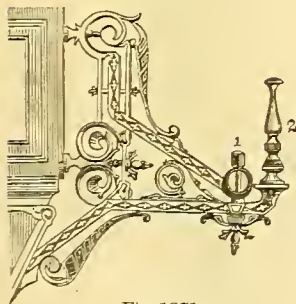


Fig. 1271.  
BERTH CURTAIN-ROD BRACKET.  
1. Berth Curtain-rod Bolt.  
2. Berth Curtain-rod Coupling.  
3. Hat-post.



Fig. 1273.  
BERTH CURTAIN-ROD  
TIP, OR ACORN.

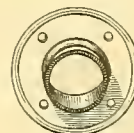


Fig. 1274.  
BERTH CURTAIN-ROD BUSHING, OR SOCKET.



Fig. 1275.  
HEAD-BOARD  
COUPLING.



Fig. 1276.  
HEAD-BOARD  
COUPLING KEEPER.

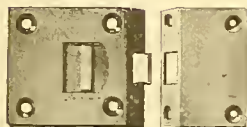


Fig. 1277.  
HEAD-BOARD RACK-CATCH AND KEEPER  
OR STRIKE-PLATE.



Fig. 1280.  
HEAD-BOARD BUSHINGS.

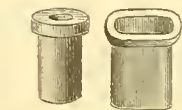


Fig. 1281.  
HEAD-BOARD BUSHINGS.

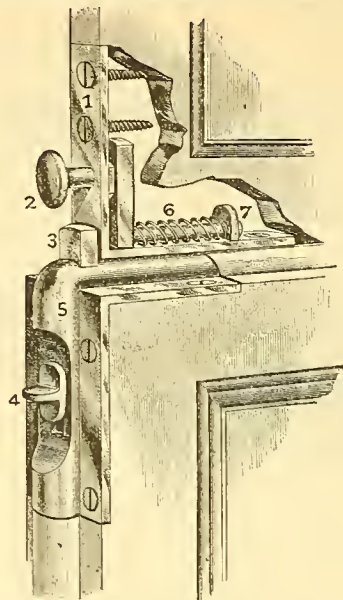


Fig. 1278.  
HEAD-BOARD BOLT AND BUSHING.  
1. Upper Face-plate.  
2. Knob-latch.  
3. Lower, or Fixed Bolt.  
4. Slide-latch.  
5. Lower Face-plate.  
6. Bolt-spring.  
7. Upper, or Spring-bolt.



Fig. 1283.  
HEAD-BOARD BOLT.



Fig. 1284.  
HEAD-BOARD RACK OR POCKET (20x6 in.).  
(More commonly of wood, as in Fig. 678.)



Fig. 1279.  
HEAD-BOARD BOLT.



Fig. 1279 1/2.  
HEAD-BOARD LUG.

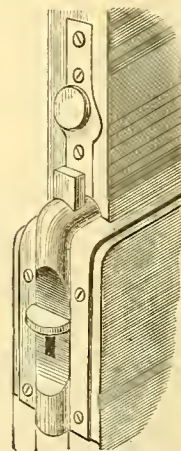


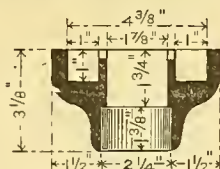
Fig. 1282.  
HEAD-BOARD BOLT.  
Outside View.



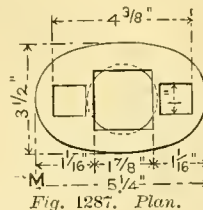
The reference letters refer to Figs. 682-685 and 1149-1153, *where the furnishings are shown attached.*



Fig. 1285.  
END BERTH-REST (N).



*Fig. 1286. Section.*



*Fig. 1287. Plan.*



*Fig. 1291.*

BERTH-CATCH COMPLETE (H).

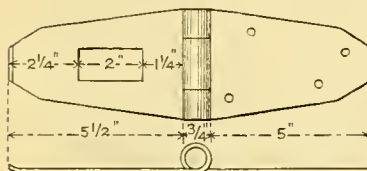


Fig. 1288.  
BERTH-HINGE (A).

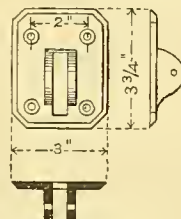


Fig. 1289.  
BERTH-CATCH (H).



Fig. 1290.  
HOOK FOR BERTH-CATCH.

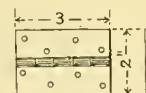
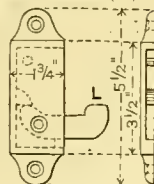
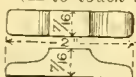


Fig. 1292.  
SEAT-HINGE.

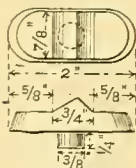


*Fig. 1293.*

UPPER-BERTH REST (K), for leaving  
upper berth partially open.  
(K to touch L).

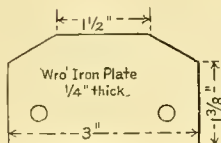


*Fig. 1296.*  
STOP-BAR GUIDE.



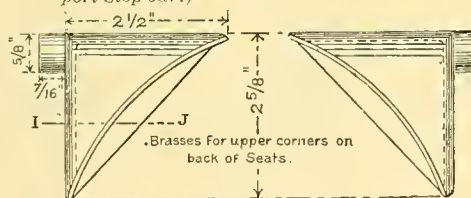
*Fig. 1297.*  
BERTH-STOP.

(Carried on upper berth at K.)



*Fig. 1294.*

STOP-BAR PLATE.  
(Screwed underneath at S to support Stop-bar.)

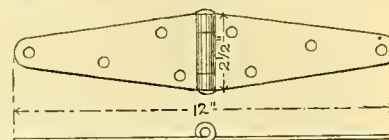


*Fig. 1298.*

SEAT-BACK CORNER.



Fig. 1299. *Elevation.*  
BERTH CORNER-BRACKET.



### STOP-BAR HINGE (A)

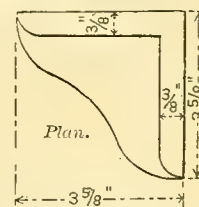


Fig. 1299. *Elevation.*  
BERTH CORNER-BRACKET.

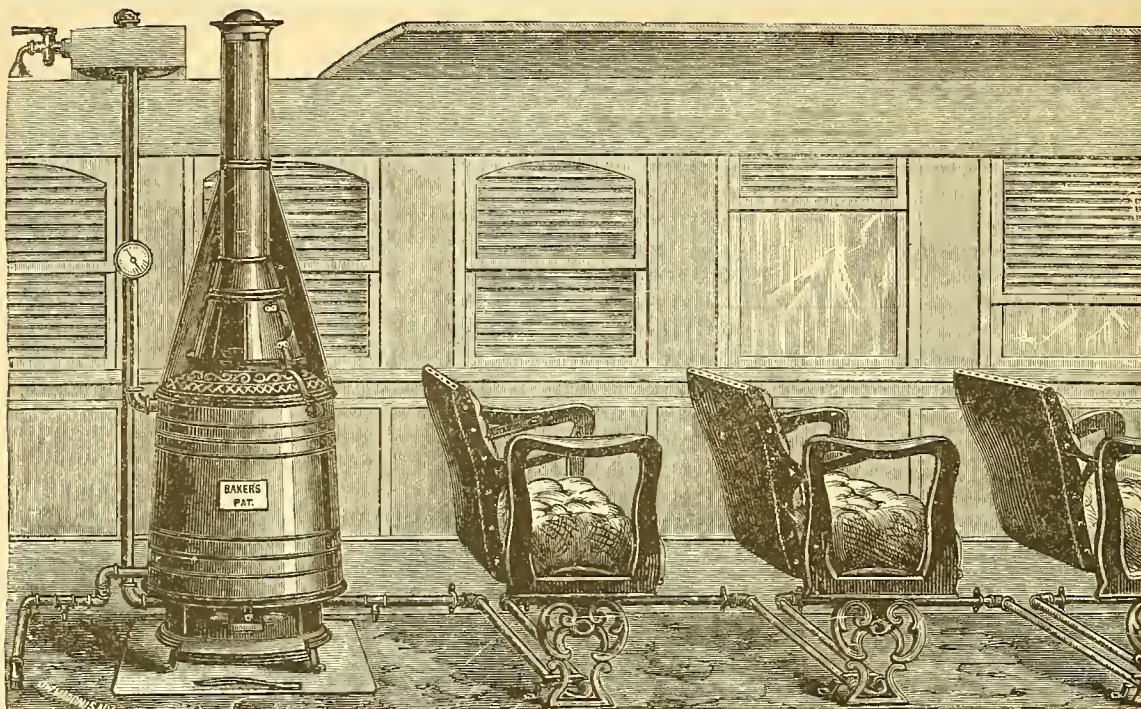


Fig. 1300. BAKER HEATER. Perspective View.

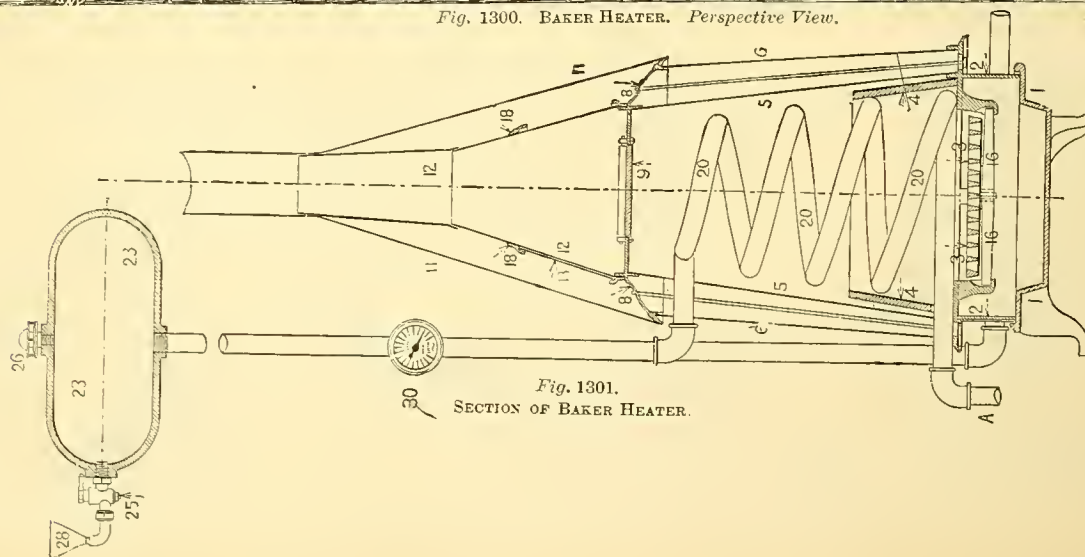


Fig. 1301.  
SECTION OF BAKER HEATER.

## BAKER HEATER.

NAMES OF PARTS OF BAKER HEATER; *Fig. 1301.**(Numbers in parentheses refer to the figures giving separate views of the same parts.)*

- |                    |        |                   |        |                             |                              |
|--------------------|--------|-------------------|--------|-----------------------------|------------------------------|
| 1. Bottom-plate.   | (1302) | 8. Cast-iron Top. | (1309) | 16. Rocking-bar, for Grate. | 23. Circulating-drum. (1325) |
| 2. Ash-pit.        | (1303) | 9. Safety-grate.  | (1310) | (1317)                      | 25. Combination-cock. (1328) |
| 3. Grate.          | (1304) | 11. Heat-guard.   | (1312) | 18. Ring, for Smoke-top.    | 26. Safety-valve. (1322)     |
| 4. Fire-pot.       | (1305) | 12. Smoke top.    | (1313) | (1319)                      | 28. Filling-funnel. (1323)   |
| 5. Inside-casing.  | (1306) | 13. Feed-door.    | (1314) | 20. Coil.                   | 30. Pressure-gauge. (1324)   |
| 6. Outside-casing. | (1307) |                   |        |                             |                              |



Fig. 1302.  
BOTTOM STOVE-PLATE.

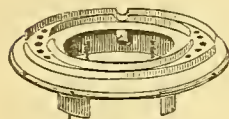


Fig. 1303.  
ASH-PIT.



Fig. 1304.  
GRATE.



Fig. 1305.  
FIRE-POT.



Fig. 1320.  
GRATE-SHAKER.

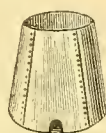


Fig. 1306.  
INSIDE-CASING.



Fig. 1307.  
OUTSIDE-CASING.



Fig. 1308.  
ASH-PIT DOOR.



Fig. 1309.  
CAST-IRON TOP.



Fig. 1321.  
COIL.



Fig. 1310.  
SAFETY-GRATE.



Fig. 1311.  
SAFETY-GRATE SPRING.



Fig. 1312.  
HEAT-GUARD.



Fig. 1313.  
SMOKE-TOP.



Fig. 1322.  
SAFETY-VALVE.



Fig. 1314.  
FEED-DOOR.

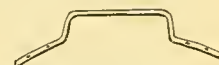


Fig. 1318.  
ASH-PIT-DOOR HANDLE.



Fig. 1315.  
FEED-DOOR HANDLE.



Fig. 1316.  
SAFETY-GRATE LATCH.



Fig. 1319.  
RING FOR SMOKE-TOP.



Fig. 1317.  
ROCKING-BAR FOR GRATE.



Fig. 1323.  
FILLING-FUNNEL.

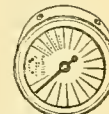


Fig. 1324.  
PRESSURE-GAUGE.



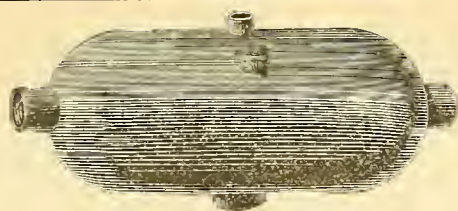


Fig. 1325.  
CIRCUATING-DRUM.

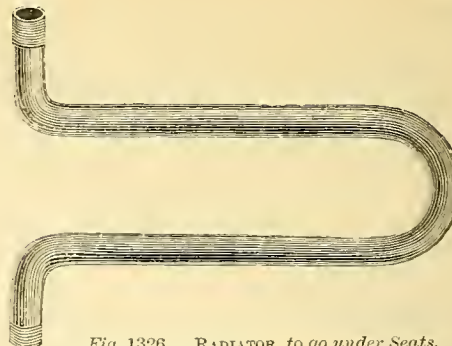


Fig. 1326. RADIATOR, to go under Seats.

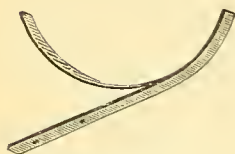


Fig. 1327.  
DRUM-SUPPORT.

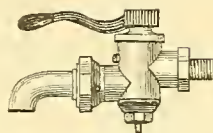


Fig. 1328.  
COMBINATION-COCK.



Fig. 1329.  
SAFETY-VALVE BALL.



Fig. 1330.  
DRUM-COVER.



Fig. 1331.  
RADIATOR-STAND.



Fig. 1332.  
PIPE-SUPPORT.

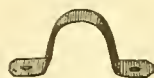


Fig. 1333.  
SINGLE PIPE-CLIP.



Fig. 1334.  
ELBOW.



Fig. 1335.  
BUSHING FOR PIPES.



Fig. 1336.  
RADIATOR-STAND.



Fig. 1337.  
CLOSE RETURN-BEND.



Fig. 1338.  
REDUCING-TEE.



Fig. 1339.  
PLUG.



Fig. 1340.  
RADIATOR-STAND.



Fig. 1341.  
OPEN RETURN-BEND.



Fig. 1342.  
NIPPLE.



Fig. 1343.  
TEE OR T.

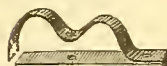


Fig. 1345.  
DOUBLE PIPE-CLIP, with BACK.

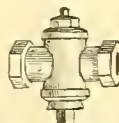


Fig. 1346.  
DRAW-OFF COCK.



Fig. 1347.  
PIPE-COUPLING.



Fig. 1344.  
REDUCING PIPE-COUPLING.



Fig. 1348.  
UNION-JOINT

# BISSELL HEATER.

The heaters as respects size are distinguished by the makers as Nos. 4 and 5, and as respects air-supply and manner of heating as follows:

- A. Plain Stove, Fig. 1349.
- B. External-air Supply, as in Fig. 1351 at top.
- C. External Supply, as at top of Fig. 1351, with sheet-iron hot-air flue passing under the seats. Flue shown at bottom of Fig. 1351.
- D. Cold air enters from the side at bottom of stove; otherwise same as C.

All of the above eight styles are furnished either with or without the safety water-base attachment shown in Fig. 1350.

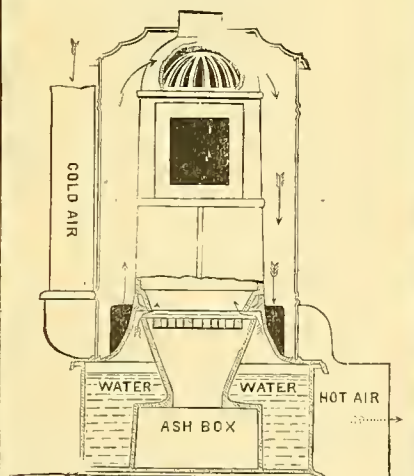


Fig. 1350.

Vertical Section, showing SAFETY WATER-BASE.

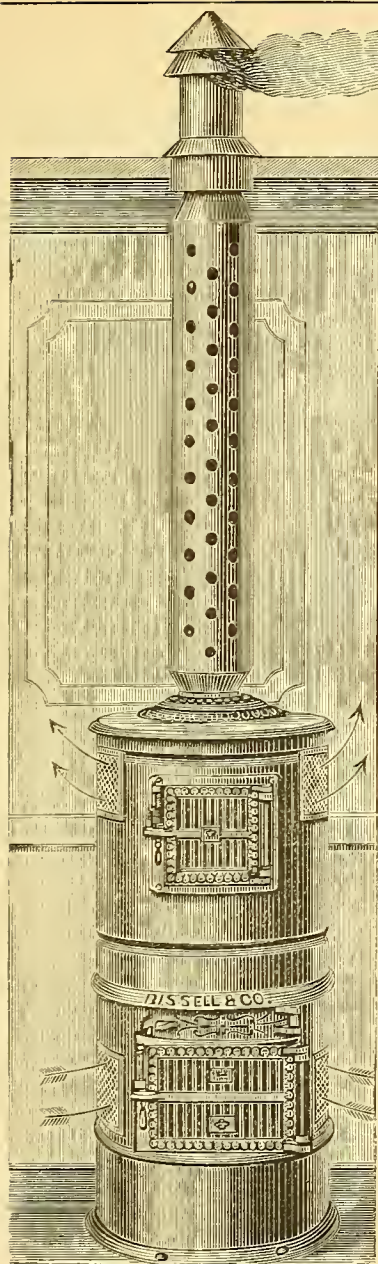
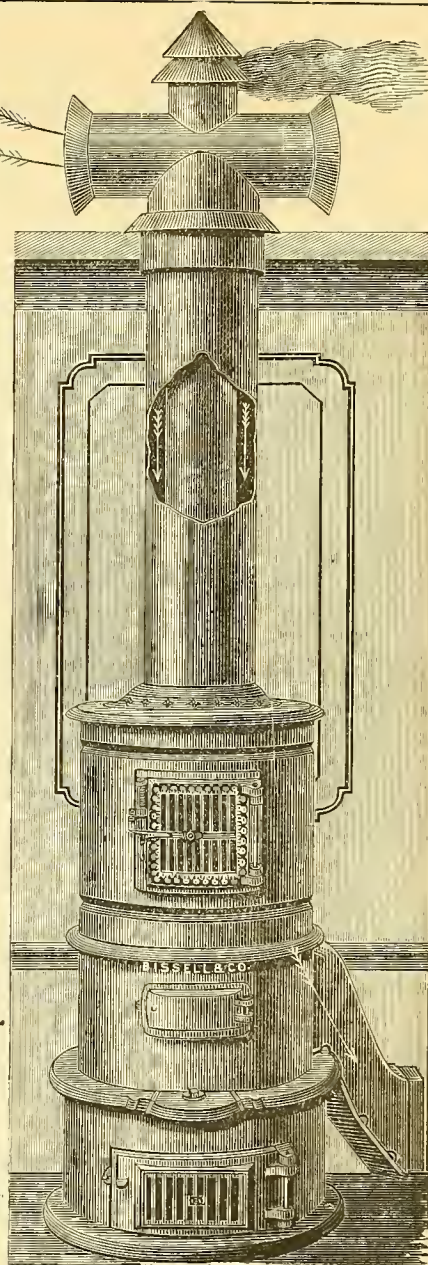


Fig. 1349.  
PLAIN STOVE,  
No. 5 A,  
without safety  
water-base.

BISSELL HEATER.

Fig. 1351  
SAFETY STOVE.  
No. 4C,  
with safety  
water-base.





DETAILS OF No. 5 BISSELL HEATER.

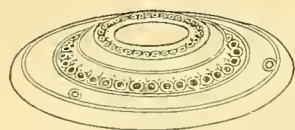


Fig. 1352. OUTSIDE TOP.

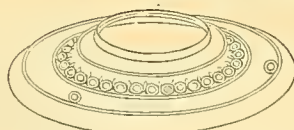


Fig. 1353. OUTSIDE TOP, for Centre Cold-air Pipe.

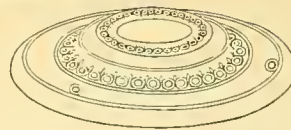


Fig. 1354. OUTSIDE TOP, for Baggage-car Stove.

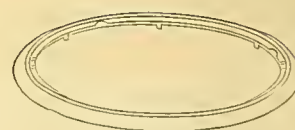


Fig. 1355. CASING-RING.

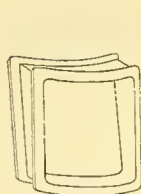


Fig. 1356. FEED-DOOR CHUTE.

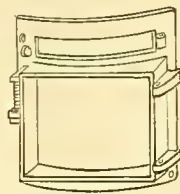


Fig. 1357. ASH-PIT DOOR-FRAME.

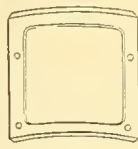


Fig. 1358. AIR-CONDUCTOR FRAME.

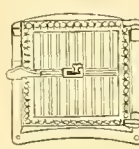


Fig. 1359. FEED-DOOR AND FRAME.



Fig. 1360. FIRE-CHAMBER. (Top Section.)

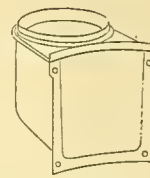


Fig. 1361. COLD-AIR CONDUCTOR.

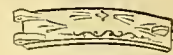


Fig. 1362. REGISTER for Baggage-car Stove.



Fig. 1363. HEAT-CONDUCTOR. (Right.)

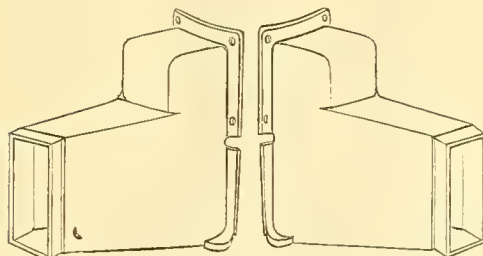


Fig. 1364. HEAT-CONDUCTOR. (Left.)

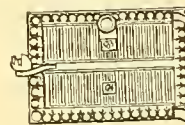


Fig. 1349. ASH-PIT DOOR.

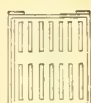


Fig. 1365. FEED-DOOR REGISTER.



Fig. 1367. GRATE AND GRATE REST.

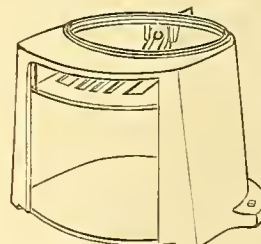


Fig. 1368. ASH-PIT AND CLINKER GRATING.

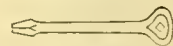


Fig. 1369. SHAKER-HANDLE.

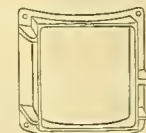


Fig. 1370. FEED DOOR FRAME.



Fig. 1371. FIRE-CHAMBER. (Lower Section.)

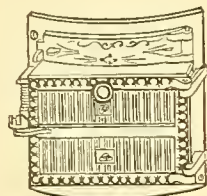


Fig. 1372. ASH-PIT FRONT, with ASH-DOORS.

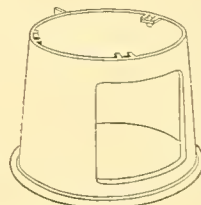


Fig. 1373. FIRE-CHAMBER. (Middle Section.)

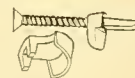


Fig. 1374. SPRING-LOCK.



Fig. 1375. INSIDE PERFORATED-TOP.

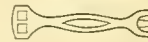


Fig. 1376. SPRING-LOCK HANDLE.

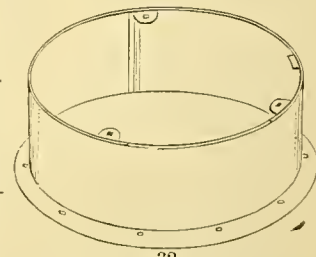


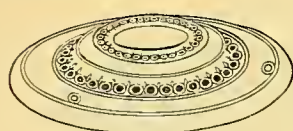
Fig. 1377. EXTREME BOTTOM.

Fig. 1375. CLINKER-GRATING.

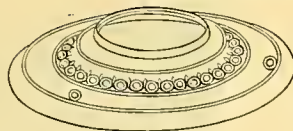
(The numbers immediately below the figures are the same as used in the makers' lists.)



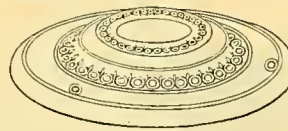
## DETAILS OF No. 4 BISSELL HEATER.



1  
Fig. 1378.  
OUTSIDE TOP.



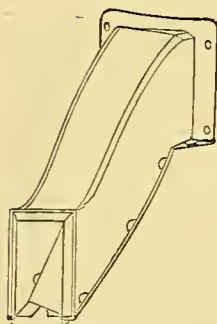
2  
Fig. 1379.  
OUTSIDE TOP for Centre  
Cold-air Pipe.



3  
Fig. 1380.  
OUTSIDE TOP for Baggage-  
car Stove.



4  
Fig. 1381.  
CASING-RING.



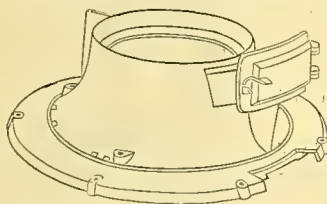
5  
Fig. 1382.  
HEAT-CONDUCTOR (Right).



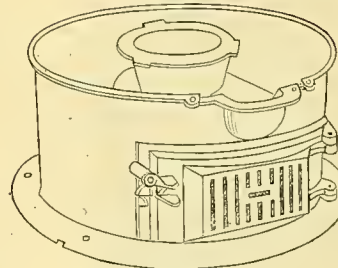
6  
Fig. 1383. INSIDE PER-  
FORATED-TOP.



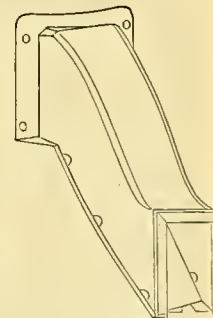
7  
Fig. 1384. CUP FOR  
WATER-BOTTOM.



8  
Fig. 1385.  
WATER-BOTTOM DOME.



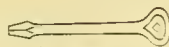
9  
Fig. 1386.  
WATER-BOTTOM, with ASH-DOOR.



10  
Fig. 1387.  
HEAT-CONDUCTOR (Left).



11  
Fig. 1388. SPRING-  
LOCK HANDLE.



13  
Fig. 1390. SHAKER-  
HANDLE.



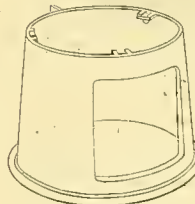
12  
Fig. 1389.  
GRATE AND GRATE-  
REST.



14  
Fig. 1391.  
FEED-DOOR REGIS-  
TER.



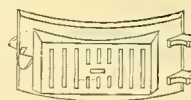
15  
Fig. 1392.  
FIRE-CHAMBER (Lower  
section).



16  
Fig. 1393.  
FIRE-CHAMBER (Middle  
section).



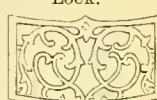
17  
Fig. 1394.



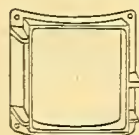
18  
Fig. 1395.  
CLINKER-DOOR AND  
DOOR-FRAME.



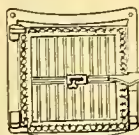
19  
Fig. 1396. SPRING  
LOCK.



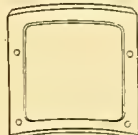
20  
Fig. 1397.  
AIR-REGISTER for Bag-  
gage-car Stoves.



21  
Fig. 1398.  
FEED-DOOR FRAME.



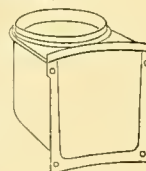
22  
Fig. 1399.  
FEED-DOOR AND  
FRAME.



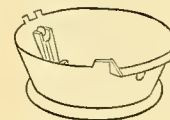
23  
Fig. 1400.  
AIR-CONDUCTOR  
FRAME.



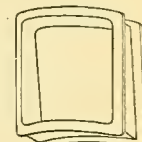
24  
Fig. 1401.  
FIRE-CHAMBER  
(Top section).



25  
Fig. 1402.  
COLD-AIR CON-  
DUCTOR.



26  
Fig. 1403.  
FUNNEL.



27  
Fig. 1404.  
FEED-DOOR  
CRUTE.

(The numbers immediately below the figures are the same as used in the makers' lists.)

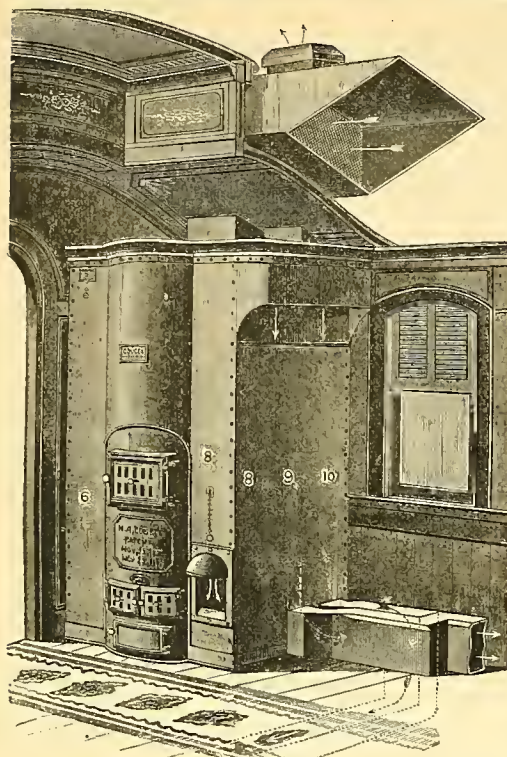


Fig. 1405. Outside View.

## GOUGE HEATER.

NAMES OF PARTS;  
Figs. 1405-1407.

(Figures in parentheses  
give the number  
which the same part  
has in the cuts of  
details, Figs. 1413  
to 1471.)

1. Movable Grate (5).
2. Fixed Grate (4)  
lying under  
the Radiator.  
16 (99).
3. Damper-rod (39).
4. Top of Mouth-  
piece (27).
5. Entrance to Ra-  
diator (99).

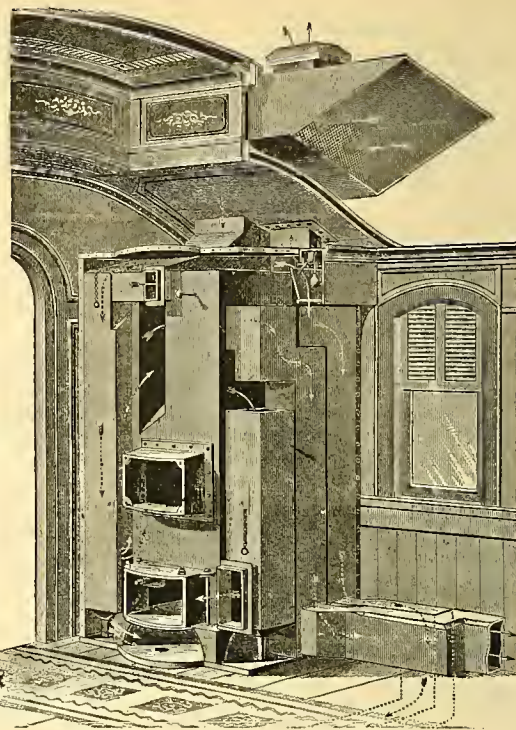


Fig. 1406. Interior View, CASING removed.

GOUGE "VENTILATOR" HEATER.

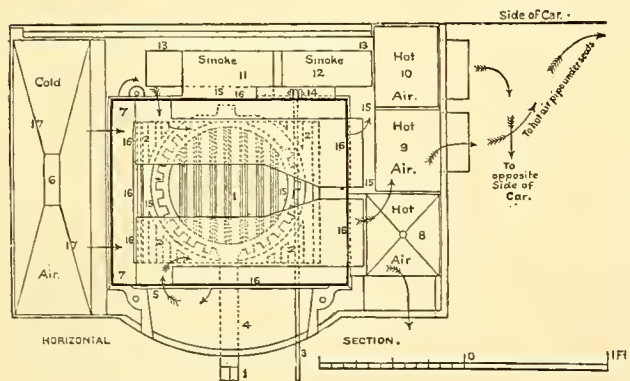


Fig. 1407. Section through Upper Damper-rod, showing ground plan.

6. Cinder-trap at bottom of  
Injector pipe for cold  
air, 17 and (56), for  
cinders entering  
through Injector or  
Roof Air-bonnet.
- 7-7. Opening for fresh air  
into heating chamber  
near floor.
8. Deflector-pipe (53) for  
discharging hot air to  
register at the stove.
9. Front Hot-air Pipe (54)  
for conducting hot-air  
into running pipe pass-  
ing under seats of car  
on same side as heater.
10. Back Hot-air Pipe (55)  
for hot-air to be con-

ducted to running pipe  
under side of car oppo-  
site to heater.

11. Long Smoke-pipe (59).
12. Short Smoke-pipe (58).
13. Smoke-box at bottom of  
11 and 12 (30) for col-  
lecting soot and cin-  
ders.
14. Damper for giving di-  
rect or return-flue  
draft (38).
15. Fire-pot.
16. Radiators (99).
17. Injector pipe for cold  
air (56) with Cinder-  
trap 6 at bottom.



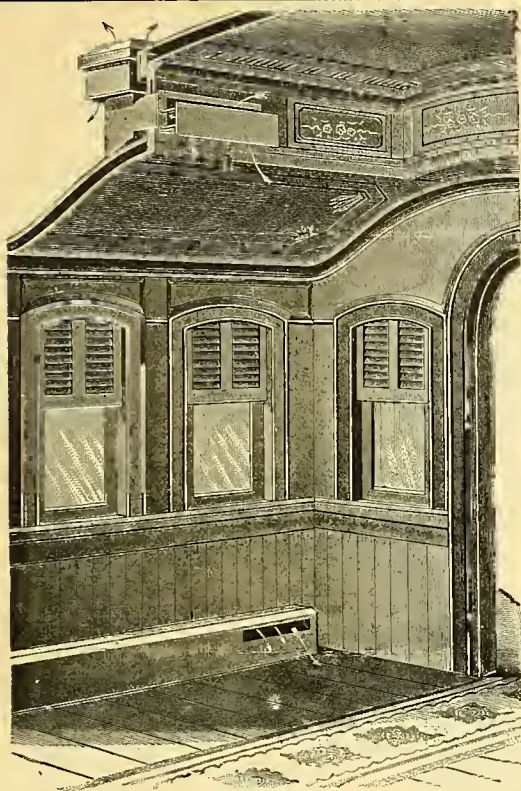


Fig. 1408.

GOUGE "VENTILATOR" HEATER.

Corner of car at opposite end from heater, showing DEFLECTING ORIFICE for fresh air and EXHAUSTING WEATHER-CAP and VENTILATING DAMPER at top.

NAMES OF PARTS; Figs. 1408 $\frac{1}{2}$ -1412.

- |                                |                            |
|--------------------------------|----------------------------|
| 10. Cast-iron Front.           | 80. Injector-end of Case.  |
| 13. Feed-door Stop.            | 81. Back of Case.          |
| 21. Dust-door.                 | 82. Deflector-end of Case. |
| 22. Draft-door (L. H.).        | 83. Bottom of Case.        |
| 23. Draft-door (R. H.).        | 84. Deflector Valve.       |
| 61. Front-lining.              | 85. Front-offset.          |
| 77. Injector Connecting-joint. | 86. Back-offset.           |
| 78. Smoke Connecting-joint.    | 87. Front of Case.         |
| 79. Top of Case.               | 88. Name-plate.            |
|                                | 89. Chain-plate.           |
|                                | 99. Radiator.              |

(The reference numbers are the same as used in the makers' lists.)

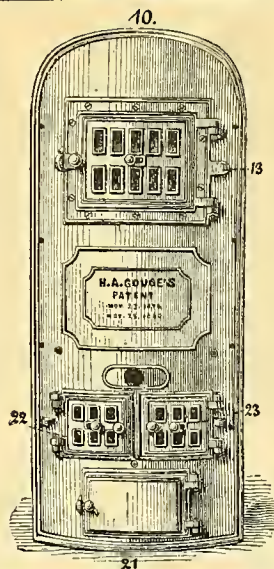
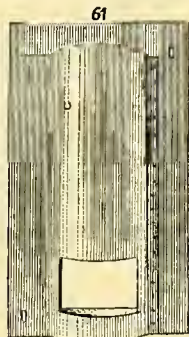
Fig. 1408 $\frac{1}{2}$ . CAST-IRON FRONT.

Fig. 1410. FRONT-LINING.

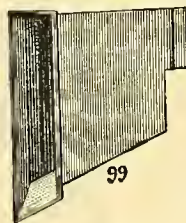


Fig. 1411. RADIATOR.

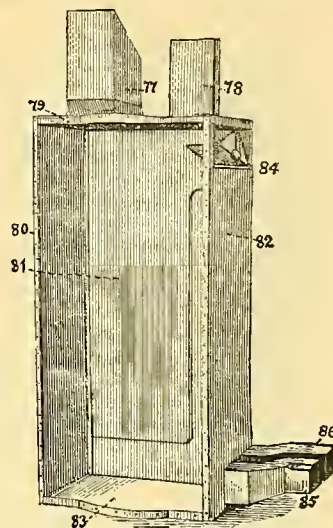


Fig. 1409. BACK OF CASE.

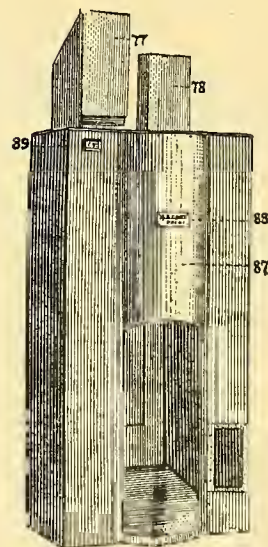


Fig. 1412. FRONT OF CASE.



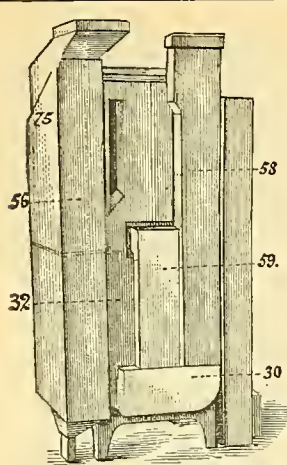


Fig. 1413.

- 30. Smoke-box.
- 32. Back Smoke-collar.
- 56. Injector-pipe.
- 58. Long Smoke-pipe.
- 59. Short Smoke-pipe.
- 75. Injector-valve.

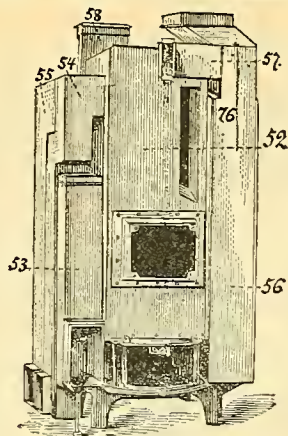


Fig. 1414.

- 52. Fire-box.
- 53. Deflector-pipe.
- 54. Front Hot-air Pipe.
- 55. Back Hot-air Pipe.
- 56. Injector-pipe.
- 57. Cold-air Elbow.
- 58. Long Smoke-pipe.
- 76. Injector-pipe Valve-chain.



Fig. 1415.

- 14. Feed-door Lining.
- 73. Injector.



Fig. 1416.  
FIXED GRATE.



Fig. 1417.  
FEED-DOOR SLIDE.



Fig. 1418.  
DUST-DOOR.



Fig. 1420. HEAD-JOINT.

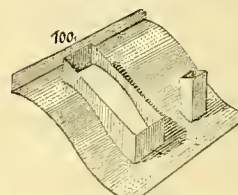


Fig. 1421. ROOF-PIECE.



Fig. 1419.

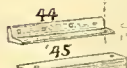
- 13. Feed-door Step.
- 16. Feed-door Knob.
- 17. Feed-door Bolt.
- 18. Feed-door Spring.
- 19. Feed-door Bolt Rest.
- 20. Feed-door Bolt Knob.
- 25. Draft-door Slide Knob.



Fig. 1422.  
CROSS-BAR.



Fig. 1423.  
BASE-BAND.



Figs. 1424-5.  
LINING-GUARD.



Fig. 1426.  
SMOKE-PIPE THIMBLE.



Fig. 1427.  
DEAD-PLATE.

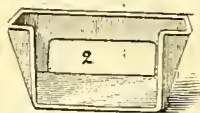


Fig. 1428.  
ASH-PIT.

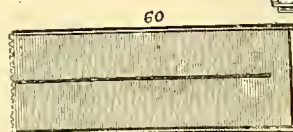


Fig. 1429.  
END LINING.



Fig. 1436.

- 10. Cast Front.
- 69. Cross-pipe.
- 71. Dust-trap Door.



Fig. 1437. OFFSET-JOINT OF RUNNING-PIPE.



Fig. 1433.  
CROSS-BAR BACK REST.



Fig. 1434.  
DAMPER BUSHING.

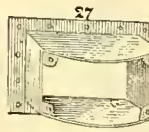


Fig. 1435.  
MOUTH-PIECE.

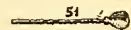


Fig. 1430.  
BALL AND CHAIN.

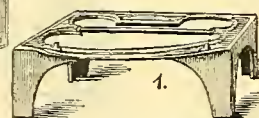


Fig. 1431. BASE.



Fig. 1438.  
DRAFT-DOOR.  
(L. and R. H.)



Fig. 1439.  
FLOOR TUBES.



Fig. 1440.  
HEAD.



Fig. 1441.  
94. Shield-box.  
95. Shield-box Valve.

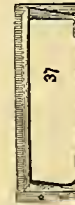


Fig. 1442.  
DEFLECTOR-  
VALVE FRAME.

(The reference numbers are the same as used in the makers' lists.)



Fig. 1444.

8. Cross-bar Front Rest.  
93. Shield-feet.

Fig. 1445.  
GRATE-SLIDE.

Fig. 1446.

35. Grate-slide Rests.  
36. Wrench.

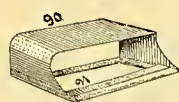


Fig. 1447.

90. Upper Deflector.  
91. Upper Deflector Guard.

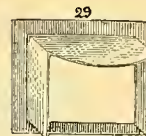


Fig. 1448.

INSIDE MOUTH-PIECE.  
BACK SMOKE-COLLAR.



Fig. 1449.

Fig. 1450.  
FEED-DOOR.Fig. 1451.  
FEED-DOOR LINING.Fig. 1452.  
MOVABLE GRATE.Fig. 1453.  
TOP SMOKE-COLLAR.Fig. 1454.  
DAMPER-FRAME.

Fig. 1455.

Fig. 1456.

38. Damper.  
39. Damper-rod.  
40. Damper-knob.  
42. Damper-clips.

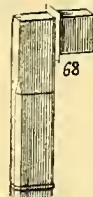
Fig. 1457.  
LOWER DEFLECTOR-FRAME.Fig. 1458.  
LOWER DEFLECTOR.Fig. 1459.  
GRATE FRAME.Fig. 1460.  
DRAFT-DOOR CATCH.Fig. 1461.  
GRATE-REST.Fig. 1462.  
INLET ELBOW.Fig. 1467.  
DRAFT-DOOR SLIDE.Fig. 1468.  
SMOKE-HEAD.Fig. 1463.  
SMOKE-BOX DOOR.Fig. 1469.  
OUTLET-ELBOW.

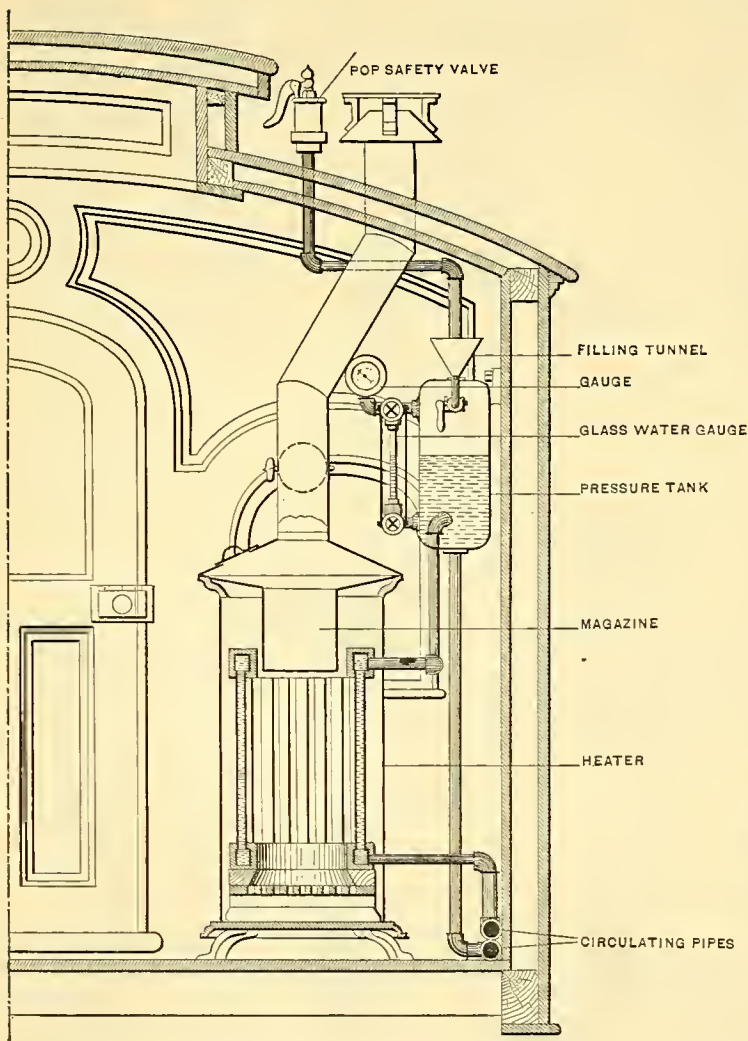
Fig. 1464.

11. Cast-front Binder.  
98. Cord and Tassel.

Fig. 1465.  
SMOKE-BOX.Fig. 1466.  
SHIELD.Fig. 1470.  
END-JOINT OF RUNNING-PIPE.Fig. 1471.  
BACK RUNNING-PIPE.

(The reference numbers are the same as in makers' lists.)

## JOHNSON HEATER.



(Separate parts are not shown by detail engravings, but they are much the same in form as similar parts in other stoves, except as indicated in the accompanying Fig. 1472, and are as follows, the numbers being the same as used in the makers' lists:)

1. Stove-leg.
2. Ash-pit Jamb (Left hand).
3. Ash-pit Jamb (Right hand).
4. Inside Ash-pit Door (Left hand).
5. Inside Ash-pit Door (Right hand).
6. Outside Ash-pit Door (Left hand).
7. Outside Ash-pit Door (Right hand).
8. Front Fire-guard.
9. Grate-shaker.
10. Outside Magazine-door.
11. Inside Magazine-door.
12. Outside Fire-door.
13. Inside Fire-door.
14. Fire-door Frame.
15. Grate-shank.
16. Grate.
17. Grate-follower.
18. Grate-follower Frame.
19. Shaker-door.
20. Shaker-door Frame.
21. Main Bottom.
22. Base-top.
23. Main Top.
24. Perforated Inside-top.
25. Top Ring.
26. Magazine.
27. Boiler.

Fig. 1472. SECTION OF JOHNSON HEATER.

The reference numbers are the same as used in the makers' lists.)



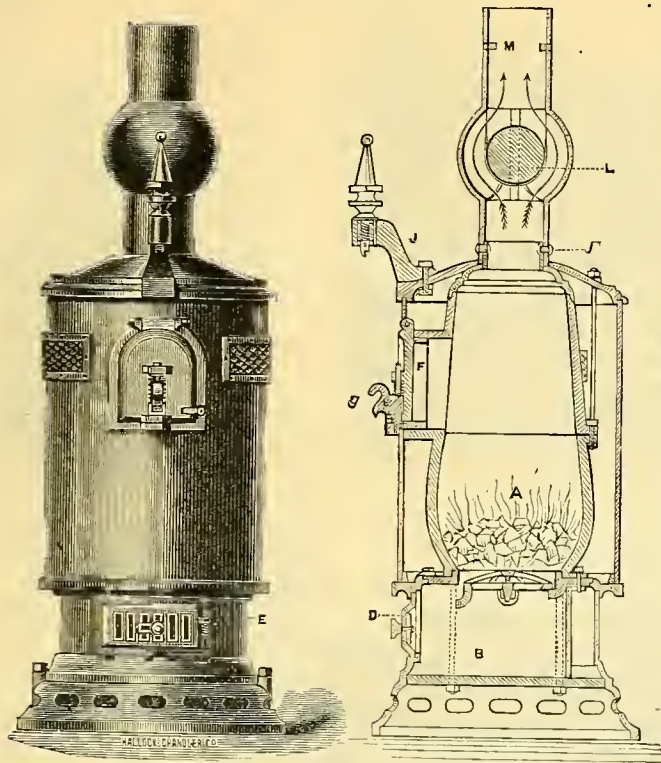


Fig. 1473. Outside View.

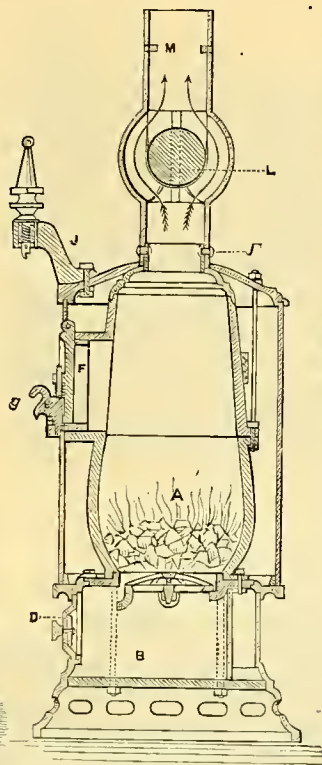


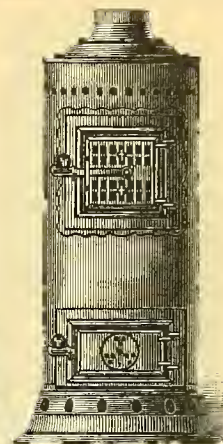
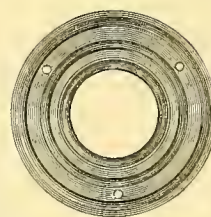
Fig. 1474. Section.

KOHLER STOVE.

(Hard or Soft Coal.)

## NAMES OF PARTS; Figs. 1473-1474.

- A. Fire-pot.
- B. Ash-pit.
- D. Ash-pit Door.
- E. Spring-catch, for Ash-pit Door.
- F. Feed-door.
- G. Spring-lock, for Feed-door.
- J. Spring-catch, for Feed-door.
- L. Safety-ball.
- M. Safety-ball Lugs.

Fig. 1475.  
HOWARD STOVE.Fig. 1476.  
CYLINDRICAL STOVE.Fig. 1477.  
STOVE-PIPE RING.Fig. 1478.  
CHILSON STOVE.Fig. 1479.  
CAST-IRON (EGG-SHAPED) STOVE.

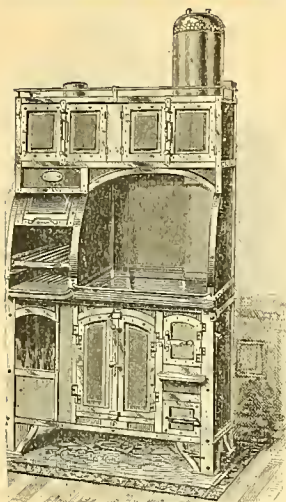


Fig. 1480.  
HOTEL-CAR RANGE,  
with broiler and hot water tank.  
Size, 3 ft. 4 in.  $\times$  2 ft. 1 in.  $\times$  5 ft. 6 in.  
Weight, 725 lbs.

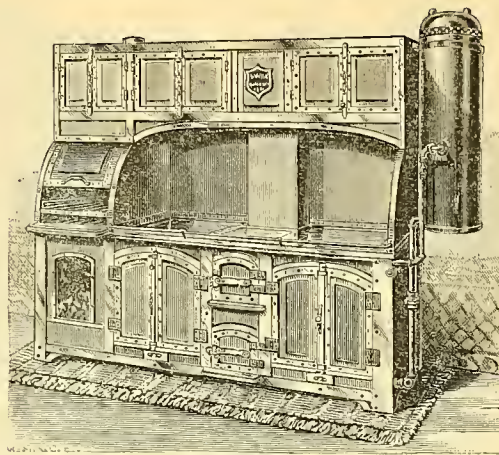


Fig. 1481.  
DINING-CAR RANGE,  
with broiler, hot-water tank and fuel-chest.  
Size, 6 ft. 0 in.  $\times$  2 ft. 10 in.  $\times$  5 ft. 6 in.  
Weight, 1,250 lbs.

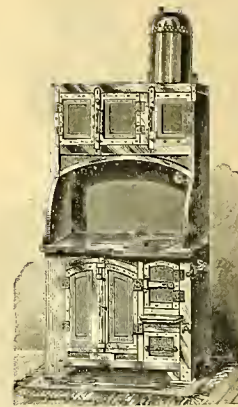


Fig. 1482.  
DIRECTORS'-CAR RANGE,  
with hot-water tank.  
Size, 2 ft. 6 in.  $\times$  1 ft. 10 in.  
 $\times$  5 ft. 0 in.  
Weight, 490 lbs.

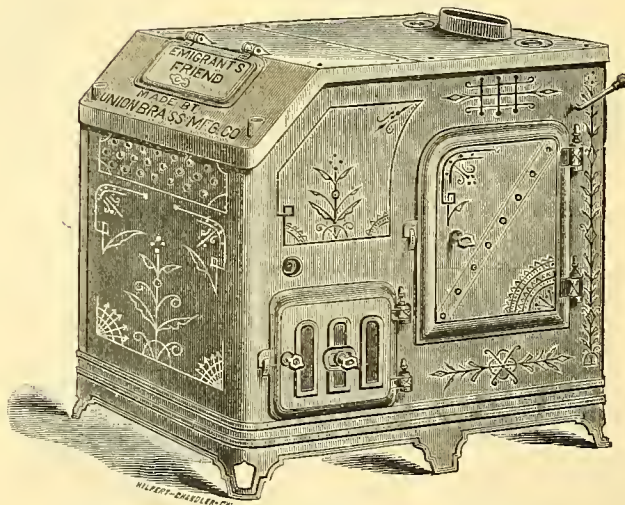


Fig. 1483. EMIGRANT-CAR COOK-STOVE, with one oven.  
Size, 2 ft. 6 in.  $\times$  2 ft. 6 in.  $\times$  1 ft. 10 in. Weight, 625 lbs.  
(The same stove is built with an addition affording three cooking ovens; increasing its height to 4 ft. 8 in. and its weight to 700 lbs.)



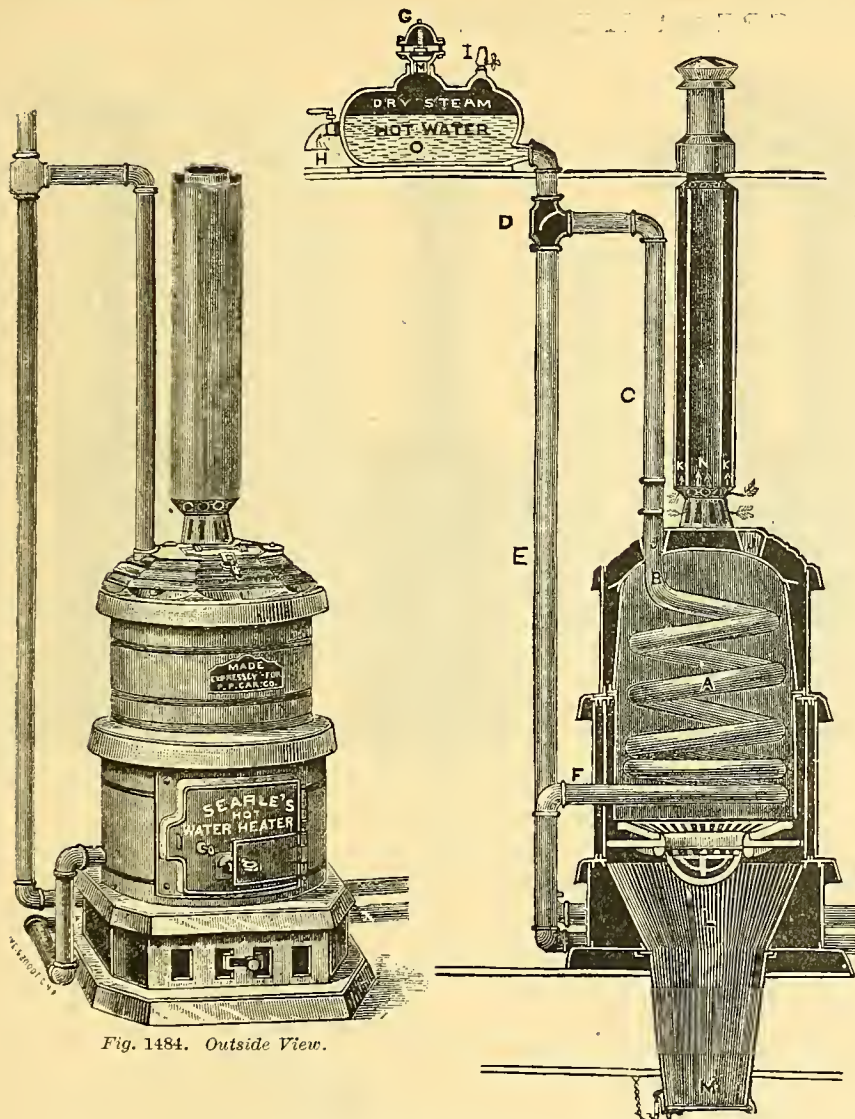


Fig. 1484. Outside View.

Fig. 1485. Section.

## SEARLE HOT-WATER HEATER.

SEARLE HOT-  
WATER HEATER.

NAMES OF PARTS ; Figs. 1484-1485.

- A. Coil.
- B. Outlet.
- C. Outflow-pipe.
- D. Deflector.
- E. Delivery-pipe.
- F. Cold Feed-pipe.
- G. Safety-valve.
- H. Waste-cock.
- I. Feed-cock.
- J. Outflow-pipe Passage.
- K. Smoke-pipe Casing.
- L. Ash-pit.
- M. Ash-dump.
- N. Stove-pipe.
- O. Expansion-drum.

Near K. { Pipe-collar Register.

Near C, not shown in cut. { Cut-off Valve.

(Names of parts not shown in the above figures and list are substantially the same as similar parts of other hot-water heaters.)



# SPEAR HEATER.

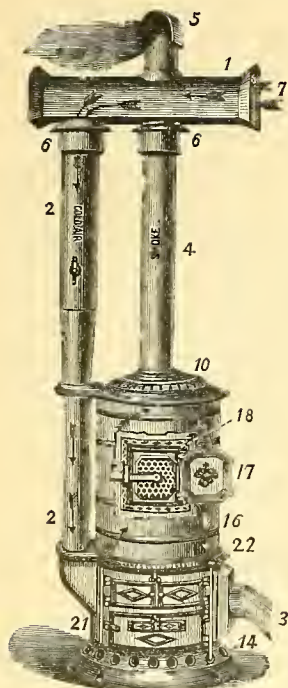


Fig. 1486.

SPEAR CAR-HEATER.  
(Pattern A.)

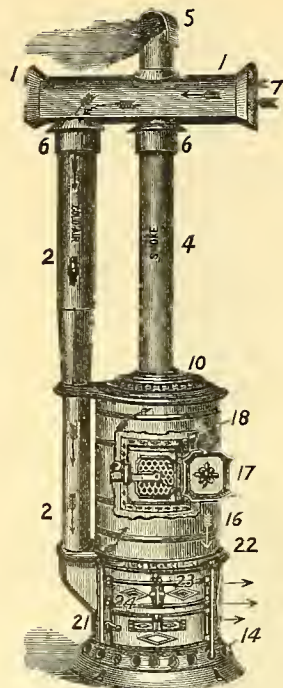


Fig. 1487.

SPEAR CAR-HEATER.  
(Pattern B.)

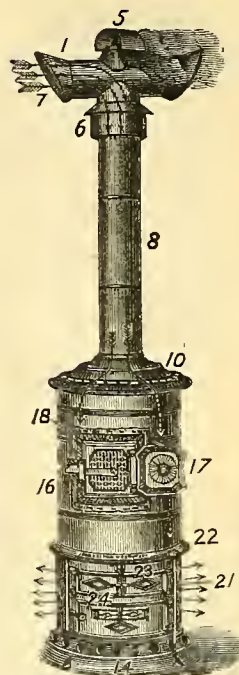


Fig. 1488.

SPEAR CAR-HEATER.  
(Pattern C.)

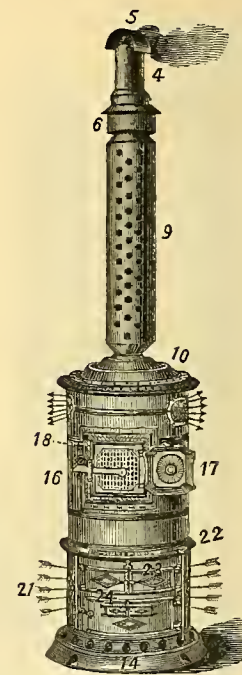


Fig. 1489.

SPEAR CAR-HEATER.  
(Pattern D.)

## NAMES OF PARTS OF SPEAR HEATERS ; Figs. 1486-1490.

- |                                  |                         |                              |
|----------------------------------|-------------------------|------------------------------|
| 1. Ventilator, or Wind-scoop.    | 10. Outside Top-plate.  | 18'. Grate.                  |
| 2. Cold-air Pipe.                | 11. Inside Top-plate.   | 18. Fire-door Frame.         |
| 3. Hot-air Pipe.                 | 12. Fire-pot.           | 19. Grate-ring.              |
| 4. Smoke-pipe.                   | 13. Ash-pit Base.       | 20. Grate-bar.               |
| 5. Smoke-pipe Cap, or Jack.      | 14. Bottom Stove-plate. | 21. Base-plate.              |
| 6. Deck-collar.                  | 15. Inside-ring.        | 22. Top-ring, of Base-plate. |
| 7. Screen, for Hood.             | 16. Casing.             | 23. Ash-pit Front.           |
| 8. Smoke-pipe Casing.            | 17. Fire-door.          | 24. Ash-pit Door.            |
| 9. Perforated Smoke-pipe Casing. |                         |                              |

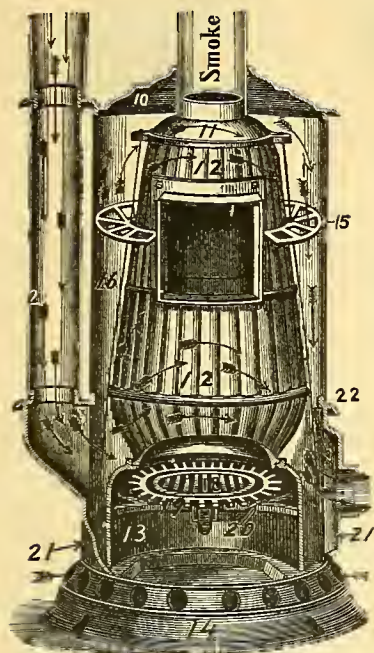


Fig. 1490.  
SPEAR ANTI-CLINKER CAR-HEATER.  
Section.

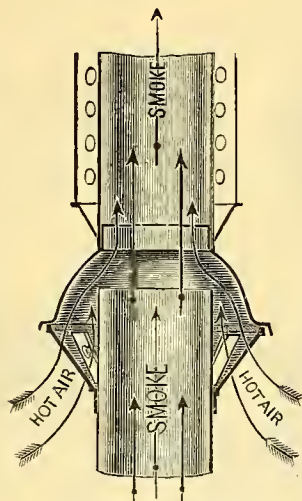


Fig. 1491.  
HEAT AND DRAFT REGULATOR,  
for A and D Stoves.

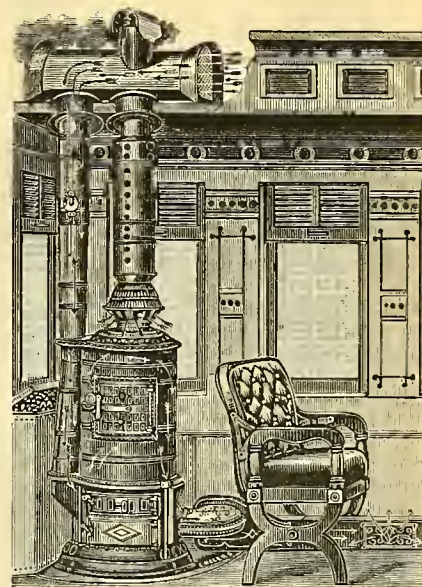


Fig. 1492.  
A Stove, with HEAT AND DRAFT REGULATOR.



Fig. 1493.  
(1). OUTSIDE TOP-PLATE, for Stoves A and B.  
Collar in the centre.



Fig. 1494.  
(2). OUTSIDE TOP-PLATE, for Stove C.  
Collar in the centre.



Fig. 1495  
(3). OUTSIDE TOP-PLATE, for Stove D.  
Collar in the centre.



Fig. 1496.  
(4). VALVES FOR TOP-PLATE, for Stove C.



Fig. 1497.  
(5). INSIDE TOP-PLATE, for Stoves A, B, C  
and D. Collar in the Centre.

(The reference numbers in parentheses are the same as used in the makers' lists.)





(6)

Fig. 1498.

FIRE-POT, for stoves A, B, C and D.  
Collar in the centre.

Top Sect. of  
Cylinder.

Middle Sect.  
of Cylinder.

Lower Sect.  
of Cylinder.



(7)

Fig. 1499.

ASH-PIT BASE, for stoves  
A, B, C and D.



(8)

Fig. 1500.

BOTTOM STOVE-PLATE, for stoves  
A, B, C and D.



(9)

Fig. 1501.

BACK BASE-PLATE, OUTSIDE  
for stoves A, B, C and D.



(11)

Fig. 1502.

FIRE-DOOR AND DOOR-FRAME,  
for stoves A, B, C and D.



(10)

Fig. 1503.

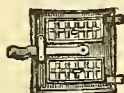
INSIDE RING, for stoves  
A, B, C and D.



(12)

Fig. 1504.

FIRE-DOOR FRAME, for stoves  
A, B, C and D.



(13)

Fig. 1505.

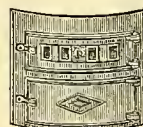
FIRE-DOOR, for stoves A, B, C and D.



(14)

Fig. 1506.

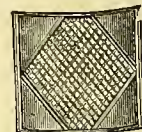
GRATE AND GRATE-BAR, for  
stoves A, B, C and D.



(17)

Fig. 1507.

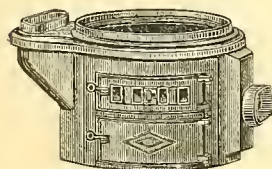
ASH-PIT FRONT, with Doors, for  
stoves A, B, C and D.



(18)

Fig. 1508.

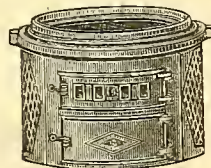
BASE-PLATE SCREEN, for  
stoves C and D.



(19)

Fig. 1510.

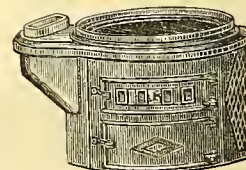
BASE-PLATE, with TOP-RING, for  
stove A.



(20)

Fig. 1511.

BASE-PLATE, with TOP-RING AND  
ASH-PIT DOORS, for stoves C  
and D.



(21)

Fig. 1512.

BASE-PLATE, with TOP-RING,  
for stove B.



(22)

Fig. 1513.

TOP-RING, for base-plate for  
stoves C and D.



(23)

Fig. 1514.

OUTSIDE TOP-PLATE, for stoves  
A and D. Collar set back.

(The reference numbers in parentheses are the same as used in the makers' lists.)





*Fig. 1515.*  
(24.) OUTSIDE TOP-PLATE,  
for Stove C. Collar set back.



*Fig. 1516.*  
(25.) OUTSIDE TOP-PLATE,  
for Stove D. Collar set back.



*Fig. 1517.*  
(26.) INSIDE TOP-PLATE,  
for Stoves A and B. Collar  
set back.



*Fig. 1518.*  
(27.) INSIDE TOP-PLATE,  
for Stoves C and D. Collar  
set back.



*Fig. 1519.*  
(28.) FIRE POT,  
for Stoves A, B, C and D. Collar set back.

Top Section of  
Cylinder.

Middle Section  
of Cylinder.

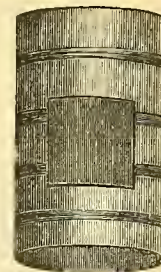
Lower Section  
of Cylinder.



*Fig. 1520.*  
(29.) BACK DIVISION-STRIPS,  
for Stoves A and B.



*Fig. 1521.*  
(30.) FRONT DIVISION-STRIPS,  
for Stoves A and B.



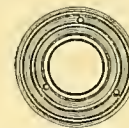
*Fig. 1522.*  
(31.) OUTSIDE RUSSIA-IRON CASING,  
for Stoves A, B, C and D.



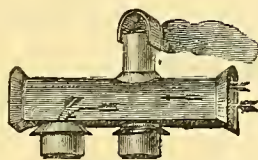
*Fig. 1523.*  
(32.) CAST-IRON HOT-AIR ELBOW AND BOX,  
for Stove A.



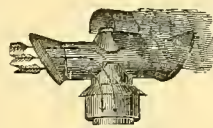
*Fig. 1524.*  
(33.) FIRE-PROOF BOTTOM,  
for Stoves A, B, C and D.



*Fig. 1525.*  
(34.) STOVE-PIPE RINGS,  
for Ceiling of Cars.



*Fig. 1526.*  
(35.) VENTILATOR OR WIND-SCOOP,  
for Stoves A and B.



*Fig. 1527.*  
(36.) VENTILATOR OR WIND-SCOOP,  
for Stove C.



*Fig. 1528.*  
(37.) STOVE-PIPE CAP,  
for Stove D.



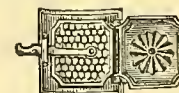
*Fig. 1528a.*  
GRATE.



*Fig. 1528b.*  
GRATE-RING.



*Fig. 1528c.*  
POKE-HOLE FUNNEL.



*Fig. 1528d.*  
DOUBLE FIRE-DOOR.

(The reference numbers in parentheses are the same as used in the makers' lists.)

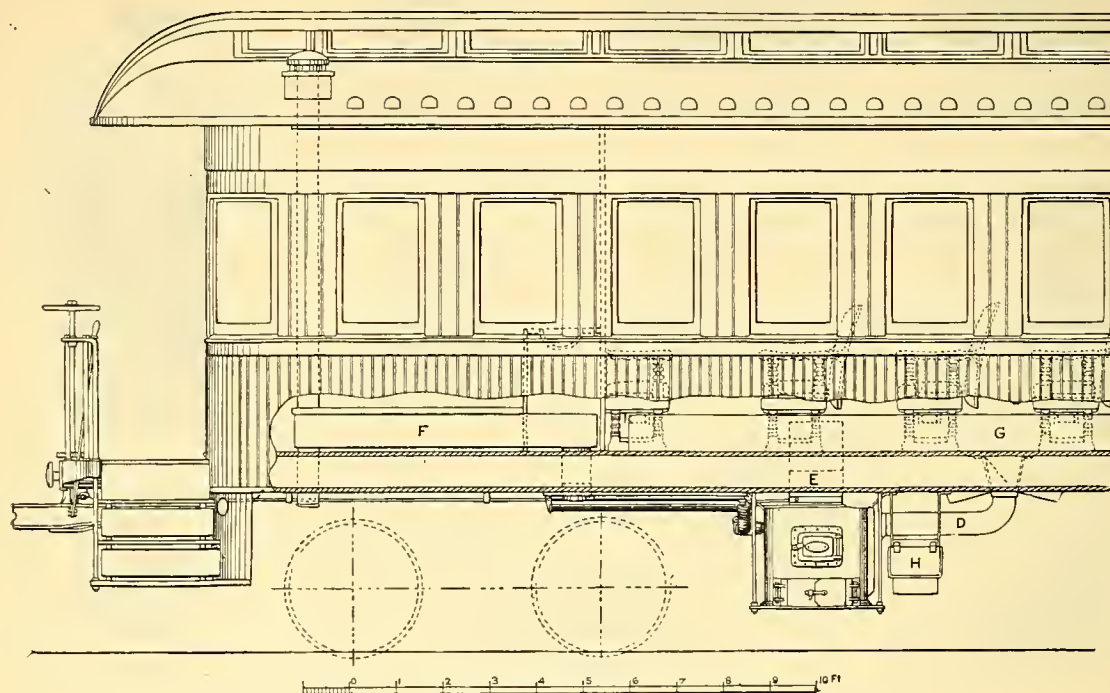


Fig. 1529. Side Elevation of Round-cornered Car with Heater.

SUSPENDED CAR-HEATER, PHILADELPHIA & READING RAILROAD.

(A plan and interior elevation of the form of passenger car her<sup>e</sup> shown are given in Figs. 187-193.)

NAMES OF PARTS; Figs. 1529-1532.

- |                          |                           |
|--------------------------|---------------------------|
| A. Furnace.              | E. Hot-air Flue.          |
| B. Inside Casing.        | F. Smoke-pipe.            |
| C. Outside Casing.       | G. Hot-air Delivery-pipe. |
| D. Cold-air Supply-pipe. | H. Coal-box.              |

(A Baker Suspended Car-heater has recently been introduced, an adaptation of the Baker heater shown elsewhere to the use of a suspended fire-box; but the details were not definitely determined on in time to include drawings in this volume.)

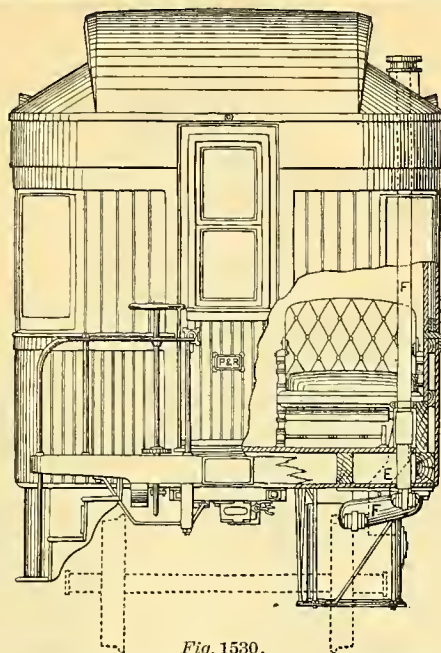


Fig. 1530.

End Elevation of Round-ended Car with Heater.  
 SUSPENDED CAR HEATER, PHILADELPHIA & READING RAILROAD.

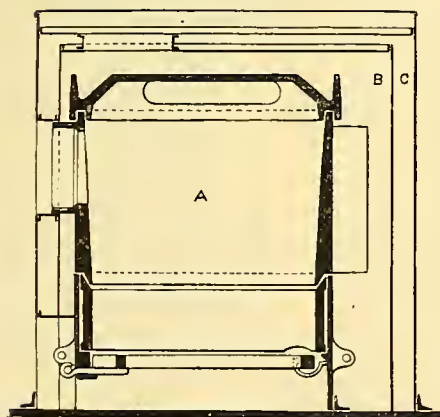


Fig. 1531. Longitudinal Section.  
 (Transverse in respect to the car.)

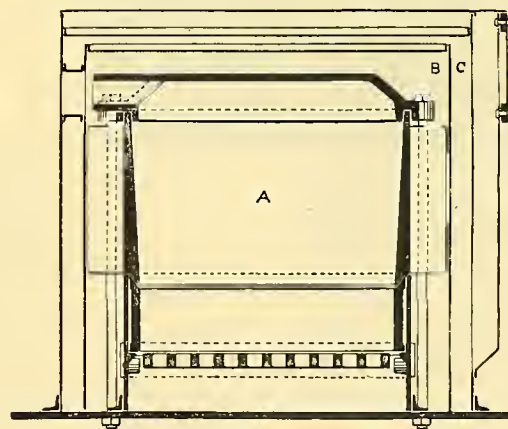


Fig. 1532. Transverse Section.  
 (Longitudinal in respect to the car.)



# WINSLOW HEATER.

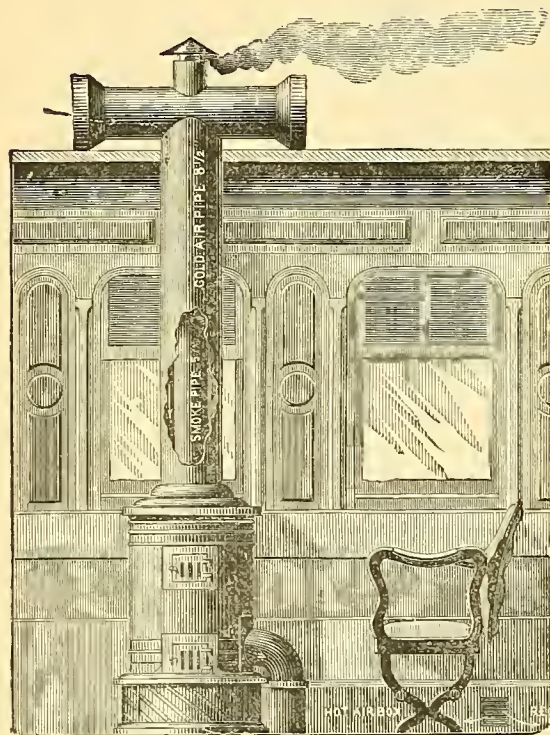


Fig. 1533.

*Perspective View.*

WINSLOW HEATER, No. 1.

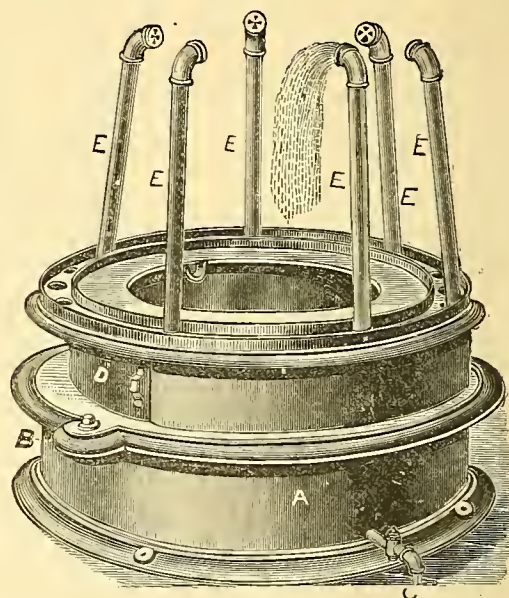


Fig. 1534.

SAFETY-TANK OF WINSLOW HEATER,  
as applied to Baker Heaters; showing internal  
construction.

- A. Safety-tank (holding 16 gallons of water).
- B. Filler.
- C. Discharge-cock.
- D. Ash-pit Damper.
- E E. Safety-pipes, leading from safety-tank into fire-pot.

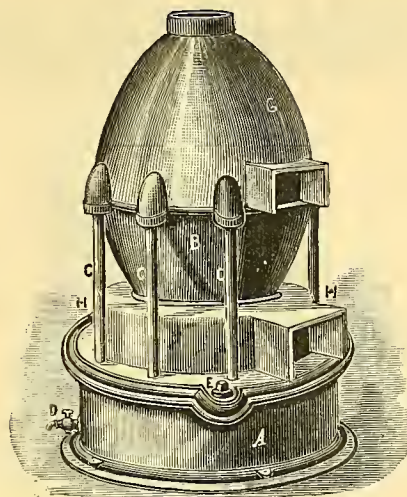


Fig. 1536  
WINSLOW HEATER,  
With casing or jacket removed.

NAMES OF PARTS; Fig. 1536.

- A. Safety-tank (holding 16 gallons of water).
- B. Fire-pot.
- C. Safety-pipes, leading from safety-tank into fire-pot.
- D. Discharge-cock.
- F. Filler.
- G. Dome.
- H. Ash-pit.

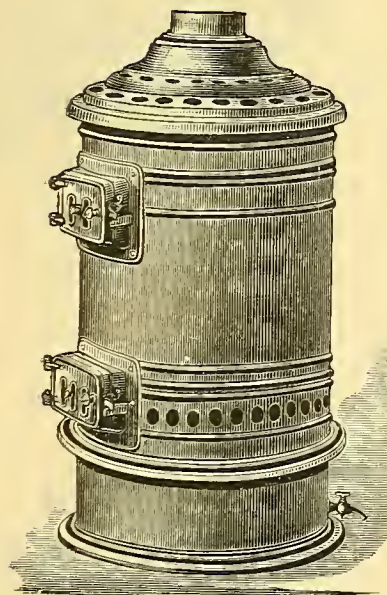


Fig. 1535.  
WINSLOW HEATER, No. 2.

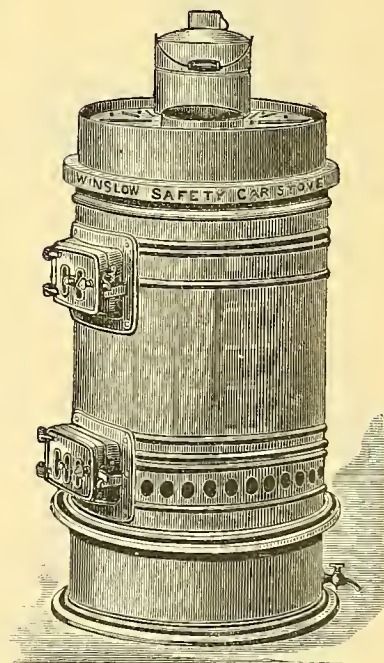


Fig. 1537.  
WINSLOW HEATER, No. 3. Flat top

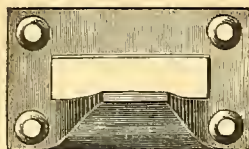


Fig. 1538.  
TABLE-HOOK PLATE.

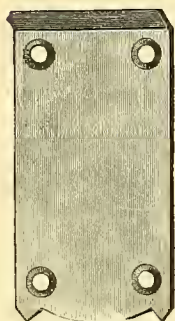


Fig. 1539.  
TABLE-HOOK.

(For tables such as are shown  
in Figs. 678-679.)



Fig. 1546.  
COAT-HOOK.

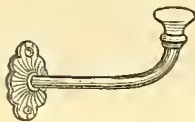


Fig. 1550.  
HAT-HOOK.



Fig. 1540.  
CASTER HOLDER.  
(17 × 4 in.)



Fig. 1541.  
CASTER-HOLDER.  
(7¼ × 3 in.)



Fig. 1542.  
CASTER-HOLDER.  
(6 × 3¼ in.)



Fig. 1545.  
RIGID CASTER, for tables.  
(See note to Fig. 1148.)



Fig. 1544.  
TABLE-HOLDER PLATE.



Fig. 1543.  
TABLE-HOLDER.



Fig. 1547.  
SLANTING TABLE-LEG HOOK.



Fig. 1548.  
SLANTING TABLE-LEG PLATE.



Fig. 1551.  
HAT-POST.

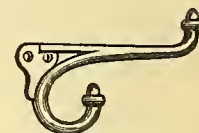


Fig. 1549.  
COAT AND HAT-HOOK.



Fig. 1552.  
HAT-POST AND HOOK.



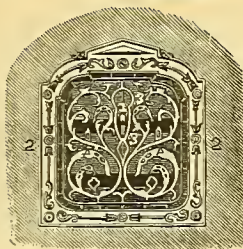


Fig. 1553.

FRIEZE-VENTILATOR REGISTER.

1. Register-handle.
2. Register-frame.
3. Register-valve.
4. Register-face.

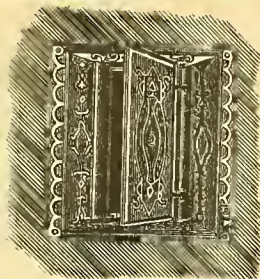


Fig. 1554.

VENTILATOR-DOOR.

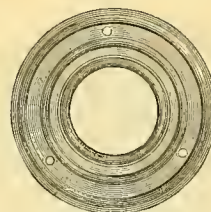
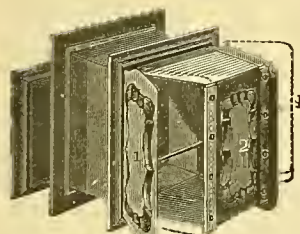
Fig. 1555.  
VENTILATOR-RING.

Fig. 1557.

AUTOMATIC VENTILATOR.

1. Ventilator-deflector.
2. Ventilator-hood.



Fig. 1558.

Perspective View.

"GLOBE" VENTILATOR.

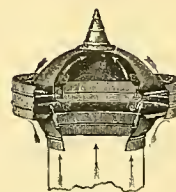
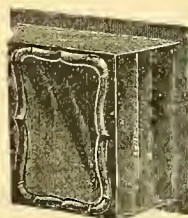


Fig. 1559.

Section.

Fig. 1556.  
PULL-HOOK OR  
DECK-SASH  
OPENER.  
(3 ft. long.)Fig. 1560.  
Inside View.Fig. 1561.  
Outside View.

"EXCELSIOR" VENTILATOR.

(See also VENTILATOR-JACK in Figs. 1092-1094, and in FURNISHINGS; STOVES AND HEATERS.)

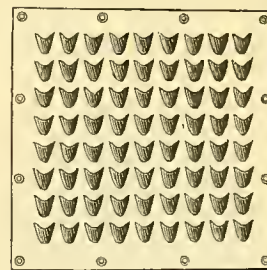
Fig. 1562.  
FRIEZE VENTILATOR-PLATE.

Fig. 1563.

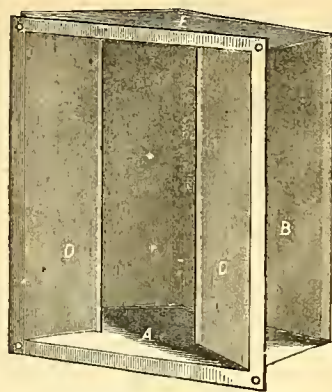


Fig. 1564. Inside View.  
"EUREKA" VENTILATOR.

NAMES OF PARTS. "EUREKA" VENTILATOR; Figs. 1564-1565.

- A. Air-passage.
- B. Air-inlet.
- D. Deflectors.
- E. Hood.

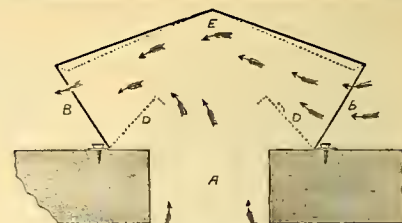


Fig. 1565. Section.  
"EUREKA" VENTILATOR.  
(1-6 full size; for openings, 5x7" and 8x8".)

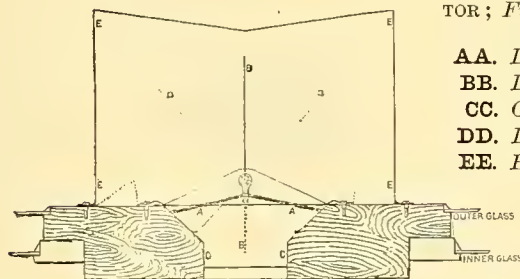


Fig. 1566.  
CREAMER'S AUTOMATIC VENTILATOR.  
(For openings,  $3\frac{3}{4} \times 7\frac{1}{2}$ " and 8x8". Outside appearance similar, to Fig. 1569, or, without hood, to Fig. 1567.)

NAMES OF PARTS, CREAMER AND "STANDARD" VENTILATOR; Figs. 1566 and 1568.

- AA. Deflector-springs.
- BB. Deflector.
- CC. Casing.
- DD. Deflector (in action).
- EE. Hood.

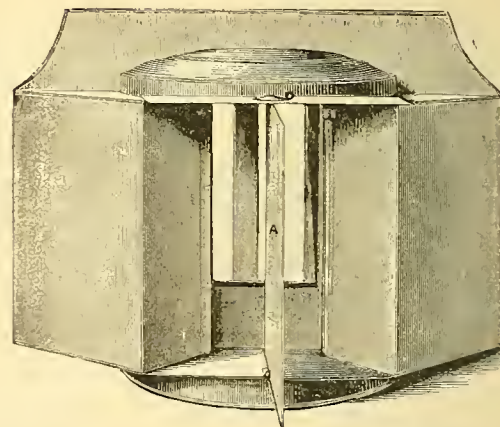


Fig. 1567.  
ROOF VENTILATOR.

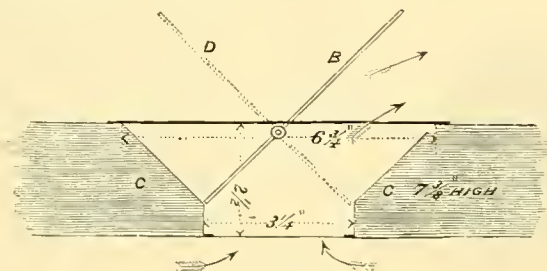


Fig. 1568.  
"STANDARD" AUTOMATIC VENTILATOR.

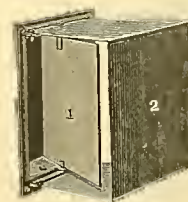


Fig. 1569.  
VENTILATOR-HOOD.  
1. Deflector. 2. Hood.



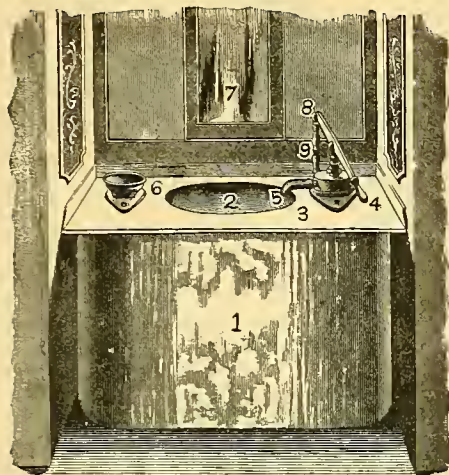


Fig. 1570. WATER TANK AND SINGLE ACTING PUMP.  
Front removed.

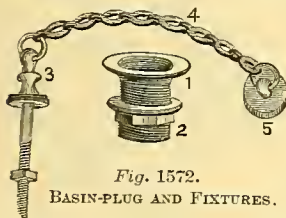


Fig. 1572.  
BASIN-PLUG AND FIXTURES.



Fig. 1573.  
WASTE-COCK  
SPIDER



Fig. 1574.  
TANK  
WASTE-COCK.



Fig. 1575.  
TANK  
WASTE-COCK  
WRENCH

1. } Basin-coupling, or Drip-coupling.
2. }
3. Basin Chain-holder.
4. Basin-chain.
5. Basin-plug.

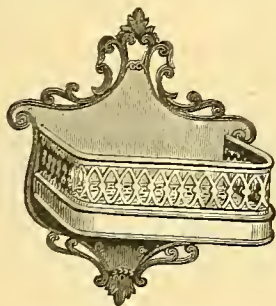


Fig. 1578. SOAP-HOLDER (Old Style).

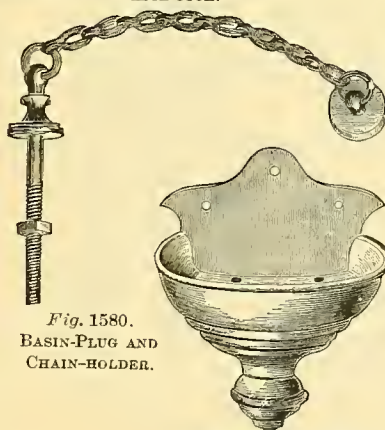


Fig. 1580.  
BASIN-PLUG AND  
CHAIN-HOLDER.

Fig. 1579½. SOAP-HOLDER.

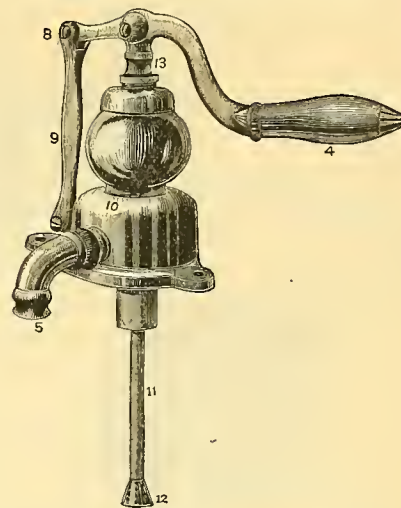


Fig. 1571.  
WASH-ROOM BASIN-PUMP (Double-acting).

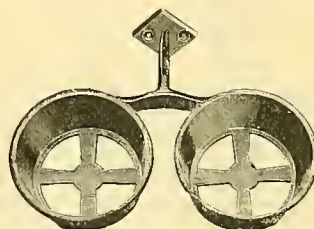


Fig. 1576.  
TUMBLER-HOLDER.  
Double.



Fig. 1577.  
TUMBLER-HOLDER.  
Single.

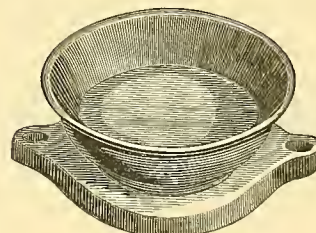


Fig. 1579. SOAP-DISH.



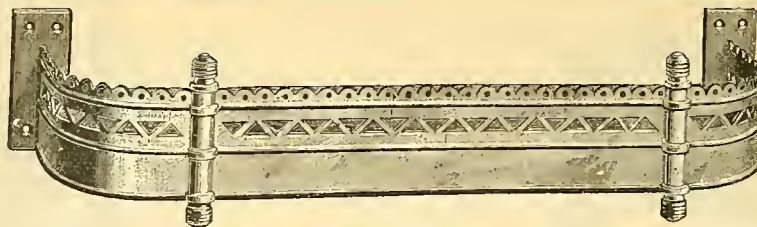


Fig. 1581. MIRROR-GUARD AND BRUSH AND COMB HOLDER. ( $19\frac{1}{2} \times 5 \times 2\frac{1}{2}$  in.)

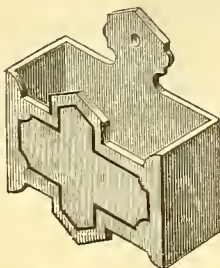


Fig. 1582. BRUSH AND COMB RACK.  
(Wooden; little used.)



Fig. 1583. TOWEL RACK. ( $19 \times 4\frac{1}{4}$  in.)

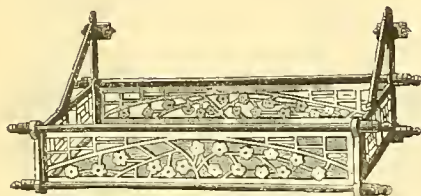


Fig. 1584. BRUSH AND COMB RACK.  
( $10 \times 4$  in.)



Fig. 1585. Fixed-end Bracket.

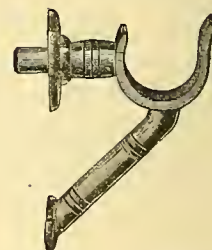


Fig. 1586. Loose-end Bracket.

TOWEL-ROLLER BRACKETS (about half size.)



Fig. 1587. MIRROR-GUARD (Cold-rolled iron; 18 and 24 in. long).



Fig. 1588. TOWEL-ROD.

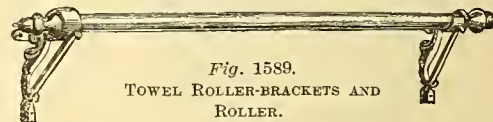


Fig. 1589.  
TOWEL ROLLER-BRACKETS AND  
ROLLER.

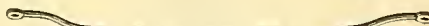


Fig. 1590. TOWEL-ROD.

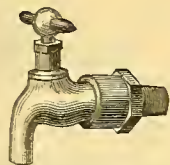


Fig. 1591.  
SELF-CLOSING FAUCET.

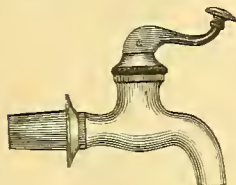


Fig. 1592.  
HORIZONTAL TELEGRAPH-COCK  
OR FAUCET.

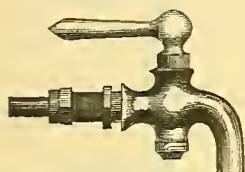


Fig. 1593. BIBB-COCK.



Fig. 1597.  
WATER-COOLER VALVE,  
with SOCKET and  
WRENCH.  
(1-5 full size.)

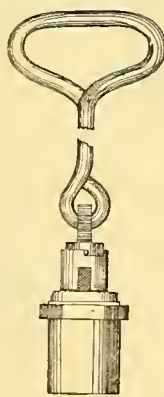


Fig. 1599.  
TANK-VALVE,  
with WRENCH.  
(1-5 full size.)



Fig. 1594. WATER-ALCOVE.  
(Sizes,  $13\frac{1}{4} \times 8\frac{1}{4} \times 5\frac{1}{4}$  in., and  $11\frac{1}{4} \times 6\frac{7}{8} \times 4\frac{1}{2}$  in.)

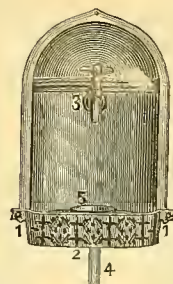


Fig. 1594 1/2. WATER-ALCOVE.  
(Old style.)

- NAMES OF PARTS; Figs. 1594-1594 1/2.
1. Water-alcove Front.
  2. Water-alcove Pan or Bottom.
  3. Alcove-faucet.
  4. Drip-pipe.

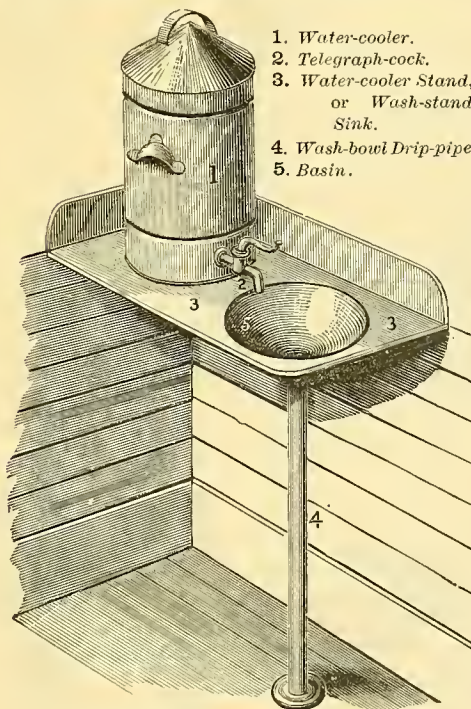


Fig. 1600. WATER-COOLER AND BASIN.  
(Emigrant-car style.)

1. Water-cooler.
2. Telegraph-cock.
3. Water-cooler Stand, or Wash-stand Sink.
4. Wash-bowl Drip-pipe.
5. Basin.

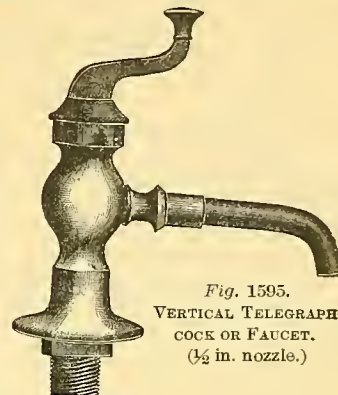


Fig. 1595.  
VERTICAL TELEGRAPH-  
COCK OR FAUCET.  
( $\frac{1}{2}$  in. nozzle.)

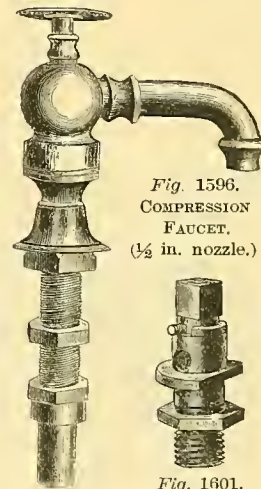


Fig. 1596.  
COMPRESSION  
FAUCET.  
( $\frac{1}{2}$  in. nozzle.)



Fig. 1601.  
WATER-COOLER  
WASTE-COCK.

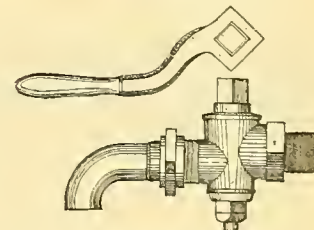


Fig. 1602. COMBINATION COCK.  
(1-5 full size.)

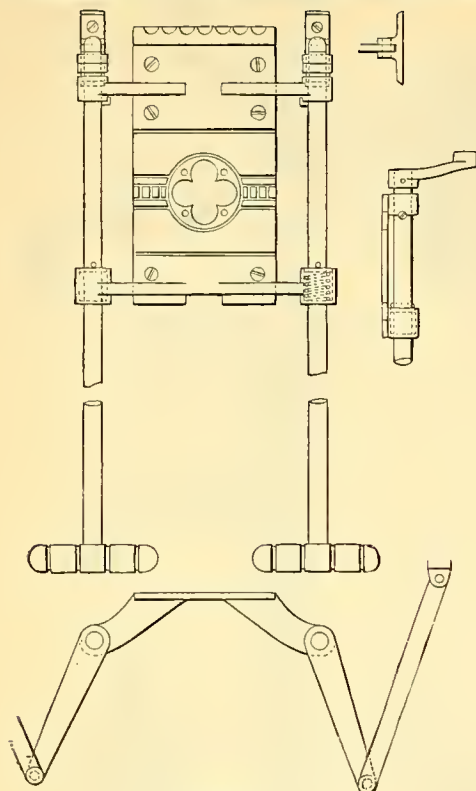


Fig. 1603.  
DECK SASH-OPENER.  
(Plate, 3 in.x5 $\frac{3}{4}$  in. Top of Handle, 9 $\frac{5}{8}$  in.  
below bottom of plate.)

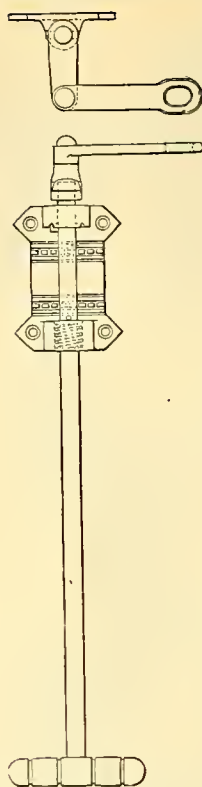


Fig. 1604.  
END-VENTILATOR OPENER.

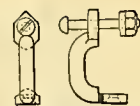


Fig. 1605.  
SWIVEL FOR  
END-VENTILATOR  
OPENER.

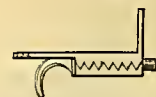


Fig. 1607.  
WINDOW-BLIND BOLT.



Fig. 1606.  
SASH-LOCK.  
(2 $\frac{1}{2}$ x1  $\frac{3}{16}$  in.)



Fig. 1608.  
SASH-LOCK  
STOP.

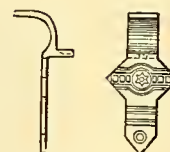


Fig. 1609.  
BLIND-LIFT.



Fig. 1610.  
SASH-LIFT.  
(Extreme length of plate, 4 in.)

WINDOW FURNISHINGS FOR PENNSYLVANIA RAILROAD STANDARD PASSENGER CAR, Figs. 178-185.

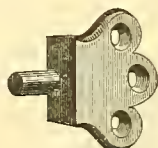


Fig. 1611.  
DECK-SASH PIVOT.

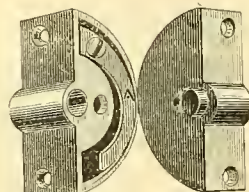


Fig. 1612.  
DECK-SASH  
PIVOT-PLATE.

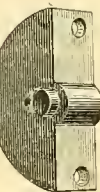


Fig. 1613.  
DECK-SASH  
PIVOT.



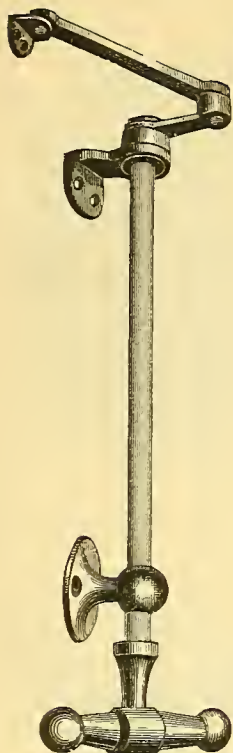


Fig. 1614.  
DECK-SASH OPENER.

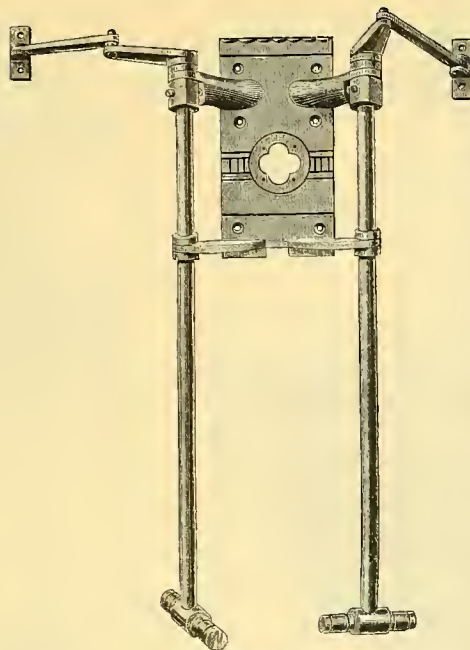


Fig. 1615.  
DECK-SASH OPENER.

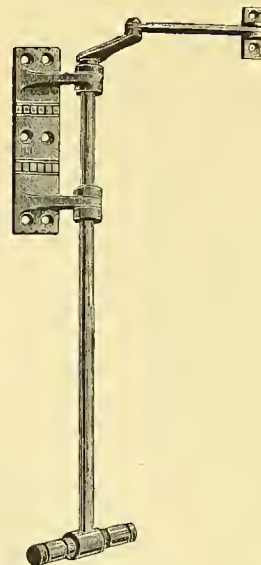


Fig. 1616.  
DECK-SASH OPENER.



Fig. 1617.  
END-VENTILATOR OPENER.

NAMES OF PARTS; Figs. 1622-1623.

- |                    |                    |
|--------------------|--------------------|
| A. Pivot-hole.     | E. Pivot.          |
| B. Detaching-slot. | F. Thumb-piece.    |
| C. Ratchet.        | G. Ratchet-spring. |
| D. Ratchet-bolt.   | H. Pivot-spring.   |

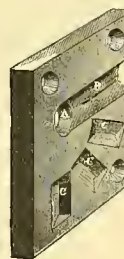


Fig. 1622.  
Ratchet-plate.

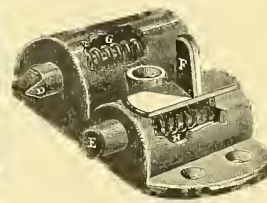


Fig. 1623.  
Pivot and Ratchet-bolt.

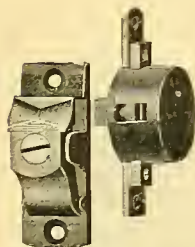


Fig. 1618. Fig. 1619.  
Clamp. Ratchet-  
pivot.

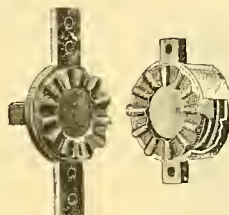


Fig. 1620. Fig. 1621.  
Upper Lower  
Ratchet- Ratchet-  
plate. plate and  
Ratchet-spring

MORGAN AUTOMATIC DECK-SASH PIVOT AND CLAMP.

"MONITOR" DECK-SASH PIVOT AND RATCHET-CATCH.

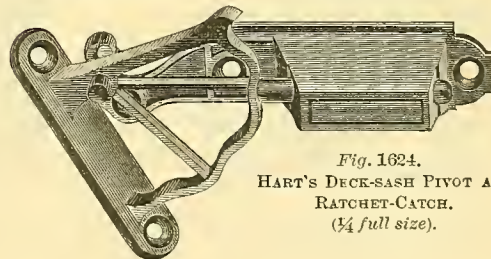


Fig. 1624.  
HART'S DECK-SASH PIVOT AND  
RATCHET-CATCH.  
( $\frac{1}{4}$  full size).

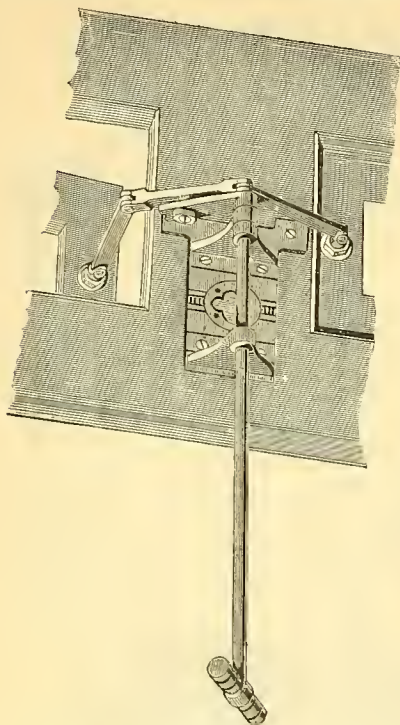


Fig. 1625.  
MANSFIELD DECK-SASH OPENER, window open.



Fig. 1631.  
DECK-SASH SOCKET AND SPRING,  
AND RATCHET-CATCH (half size).

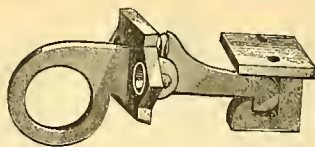


Fig. 1627.  
DECK-SASH CATCH ( $\frac{3}{4}$  full size).  
(For PULL-HOOK, used in connection  
with fittings of this kind, see Fig.  
1556.)

Fig. 1628.  
KEEPER OR STRIKE-PLATE.

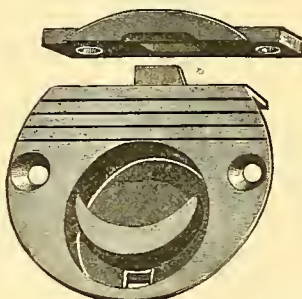


Fig. 1629.  
DECK-SASH FLUSH-CATCH ( $\frac{3}{4}$  full size).

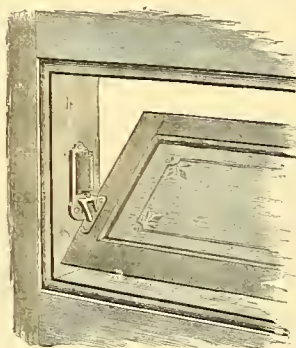


Fig. 1632.  
OUTSIDE VIEW OF DECK SASH,  
showing Figs. 1631 and 1633 in use.

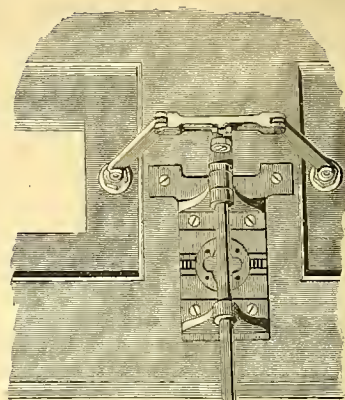


Fig. 1626.  
MANSFIELD DECK-SASH  
OPENER, windows  
both closed.

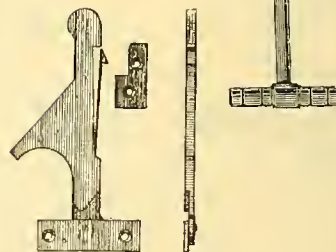


Fig. 1630.  
VENTILATOR-ARM ( $\frac{1}{4}$  full size).



Fig. 1633.  
DECK-SASH PIVOT AND RATCHET  
(half size).





Fig. 1634.  
DECK SASH-PULL, with screw.

(For PULL-HOOK used in connection with these fittings, see Fig. 1556.)



Fig. 1635.  
DECK SASH-PULL,  
with flange.

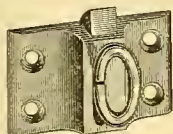


Fig. 1636.  
DECK-SASH LATCH.

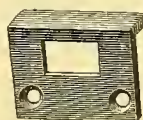


Fig. 1637.  
DECK-SASH LATCH  
KEEPER  
OR STRIKE-PLATE.

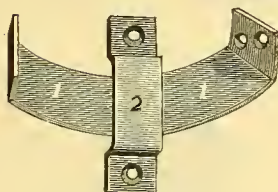


Fig. 1638.  
DECK-SASH QUADRANT AND CLIP.  
1. Quadrant.  
2. Clip.



Fig. 1639.  
DECK-SASH STOP.



Fig. 1645. Perspective View.

WILSON FLEXIBLE WINDOW-BLIND (See Figs. 1646-7.)  
(The PAUL FLEXIBLE WINDOW-BLIND is another style accomplishing the same end in a different manner. See Dictionary; not shown by illustration.)



Fig. 1640.



Fig. 1641.

DECK-SASH DOUBLE-RATCHET  
AND RATCHET-PLATE (Right hand).



Fig. 1642.

DECK-SASH SPRING PIVOT,  
for movable sash.



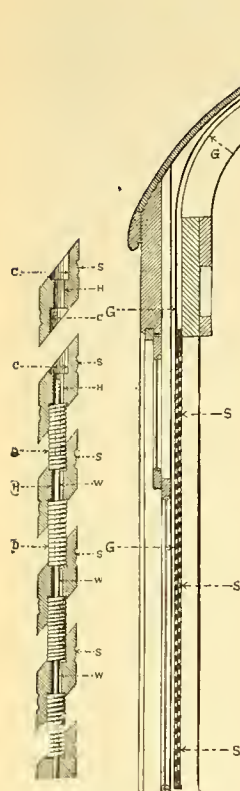
Fig. 1643.

DECK-SASH DOUBLE-RATCHET  
AND RATCHET-PLATE (Left hand).



Fig. 1644.





WILSON FLEXIBLE WINDOW-BLIND.

(See Fig. 1645.)

- C. Counter-boring.  
D. Thimble.  
G. Window blind Pocket.  
H. Slat-wire Hole.  
S. Slats.  
W. Slat-wire.

(The Construction of framing for this style of window-blind is given in Figs. 185a and 185b.)

Fig. 1648.  
DOUBLE SASH-SPRING.

Fig. 1649.  
SINGLE SASH-SPRING.

Fig. 1650.  
SPIRAL SASH-SPRING.

Fig. 1651.  
SPRING SASH-HOLDER.

Fig. 1652.  
WINDOW-BUTTON.

Fig. 1653.  
MONKEY-TAIL (half size).

Fig. 1654.  
SASH-LOCK BUSHING.

Fig. 1659.  
SASH-LOCK.

Fig. 1661. Back View.  
SASH-LOCK.

Fig. 1655.  
SASH-LOCK STOP.

Fig. 1657.  
SASH-LOCK STOP.

Fig. 1658.  
SASH-LOCK RACK.

Fig. 1660.  
SASH-LOCK STOP.  
(half size.)

1. Sash-lock Bolt.
  2. Sash-lock Spring.
  3. Sash-lock Trigger.
- (See also Fig. 1606.)

Fig. 1662.  
MONKEY-TAIL STOP.  
(4-5 full size.)



Fig. 1663.  
In act of raising sash.  
AUTOMATIC WINDOW-CATCH (half-size.)



Fig. 1664. Supporting sash.  
AUTOMATIC WINDOW-CATCH (half-size.)

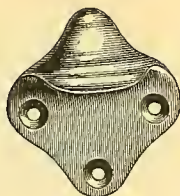


Fig. 1665.  
SASH-LIFT.



Fig. 1666.  
SASH-LIFT.

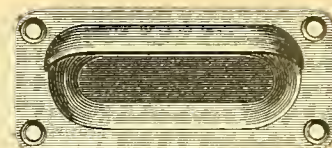


Fig. 1667.  
FLUSH SASH-LIFT.



Fig. 1668.  
SASH BAR-LIFT.



Fig. 1669.  
END DOOR SASH-LIFT.

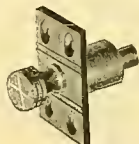


Fig. 1670.  
END DOOR SASH-BOLT.



Fig. 1671.  
KNOB SASH-LIFT.

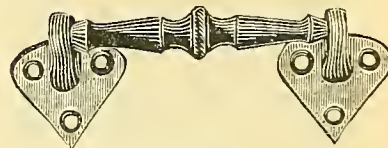


Fig. 1672.  
SASH BAR-LIFT (half-size).



Fig. 1673.  
LOWER WINDOW-BLIND  
LIFT.



Fig. 1674.  
UPPER WINDOW-BLIND  
LIFT.



Fig. 1675.  
DOUBLE WINDOW-BLIND LIFT.

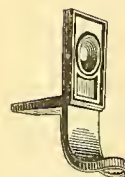


Fig. 1676.  
WINDOW-BLIND LIFT.



Fig. 1677.  
WINDOW-BLIND LIFT.



Fig. 1678.  
WINDOW-BLIND LIFT.

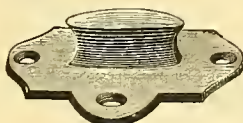


Fig. 1679.  
WINDOW-BLIND LIFT.  
(See also Figs. 1605-10).



Fig. 1680.  
WINDOW-BLIND BOLT (half-size).



Fig. 1681.  
WINDOW-BLIND BUSHING (full-size).



Fig. 1682.



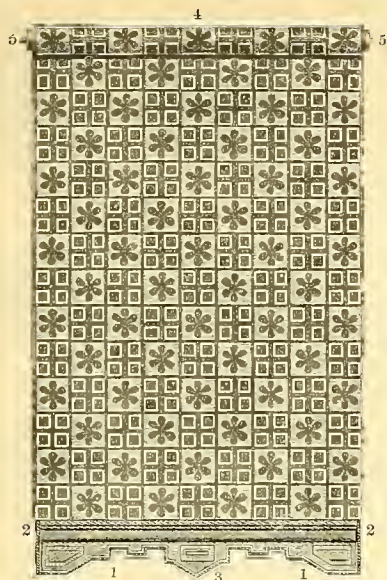


Fig. 1683.

WINDOW-SHADE OR CURTAIN.

1. Window-shade Leather.
2. Window-shade Rod.
3. Window-shade Eyelet.
4. Window-shade Roller.
5. Window-shade Roller-bearings.

Fig. 1684.

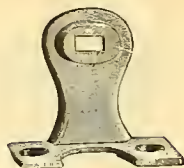


Fig. 1685.



McKAY'S CURTAIN-BRACKETS, No. 1.  
(Half size.)

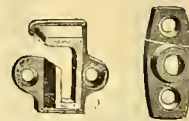


Fig. 1687.  
McKAY'S CURTAIN-BRACKETS,  
No. 2.  
(Half size.)



Fig. 1686.  
HARTSHORN SHADE-ROLLER AND BRACKETS,  
showing CENTRIFUGAL PAWLS.  
(The McKay shade-roller is somewhat similar, but uses a cam instead of a pawl.)



Fig. 1688.

WINDOW-CURTAIN



Fig. 1689.

WINDOW-CURTAIN  
ROLLER-BEARINGS.



Fig. 1690.

WINDOW-CURTAIN  
BRACKET.



Fig. 1691.

PARLOR-CAR WINDOW-CURTAIN  
BRACKET.  
( $\frac{1}{4}$  full size.)



Fig. 1692.



Fig. 1693.

WINDOW-CURTAIN ROD.

1. Window-curtain-rod Stanchion.

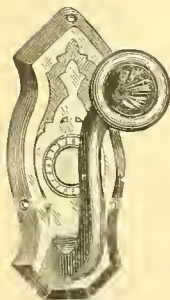


Fig. 1694.  
WINDOW-CURTAIN  
HOLDER.

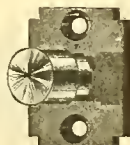


Fig. 1695.  
WINDOW-CURTAIN  
KNOB.



Fig. 1696.  
WINDOW-CURTAIN  
CORD-TIGHTENER.  
(Old style.)



Fig. 1696 $\frac{1}{2}$ .  
WINDOW-CURTAIN RING.



Fig. 1697.  
WINDOW-MOULDING  
JOINT-COVER.

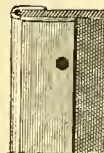


Fig. 1698.  
SINGLE EDGE  
WEATHER-STRIP.  
(Metal Moulding.)



Fig. 1699.  
CUSHION WEATHER-  
STRIP.  
(Metal Moulding.)

(Full size. Also made with wooden  
moulding, but the latter little  
used for car work.)



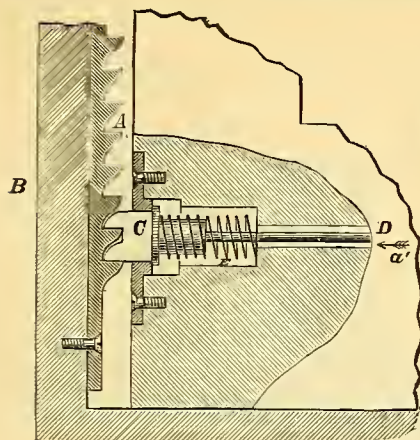


Fig. 1700. Section.  
(D connects to the bell-crank F, Fig. 1702.)

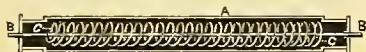


Fig. 1701. LIFTING-PLATE.  
Front View.

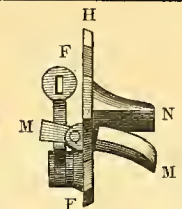


Fig. 1702. LIFTING-PLATE.  
Side View.

WOLFRATH'S COMBINATION SASH-LIFT AND SASH-LOCK,

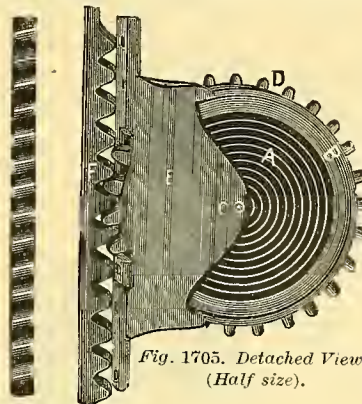


Fig. 1703. Detached View.  
(Half size).

Fig. 1704. Front  
View of BEVELED  
RACK. (Half size.)

- A. Spring.
- B. Band.
- C. Pinion.
- E. Carriage.
- F. Beveled Back.
- Detent Latch not shown.

ORMSBY SASH-BALANCE.

NAMES OF PARTS, Figs.  
1700-1702.

- A. Rack.
- a'. Sash-lock.
- B. Window-casing.
- C. Ratchet-bolt.
- D. Ratchet-rod.
- E. Ratchet-mortise.
- F. Bell-crank.
- H. Face-plate.
- M. Lifting-plate.
- N. Finger-plate, or  
Trigger-plate.



Fig. 1705. Applied to  
window.

- A. Balance, complete.
- B. Window-casing.
- C. Beveled-rack on Window-stile.



Fig. 1706. ORMSBY SASH-BALANCE (overhead style).  
(This drawing represents the principle of the  
device only and not its actual application.)

NAMES OF PARTS, Fig. 1703.

- A. Cylinder.
- B. Pivot-rod.
- C. Lifting-spring.
- D. Window-cord.
- E. Window-rail.

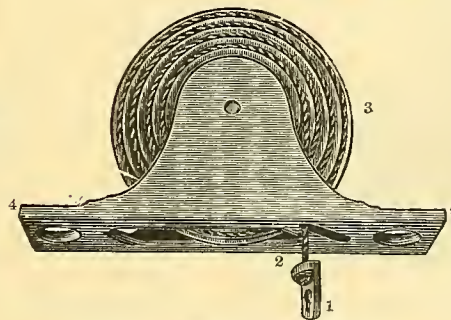


Fig. 1707. ANDERSON SASH-BALANCE.

NAMES OF PARTS; Fig. 1707.

- 1. Lug.
- 2. Wire Cord.
- 3. Cone, or Fusee.
- 4. Frame.
- Pivot (not numbered).

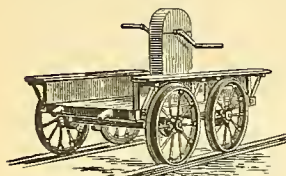


Fig. 1708.  
CRANK HAND CAR,  
with RAVES.

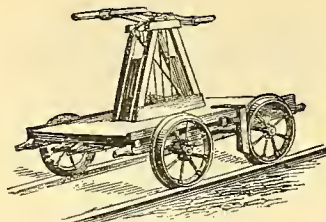


Fig. 1709.  
LEVER HAND CAR.  
(Shown in detail in Figs. 1720-1723.)



Fig. 1710.  
INSPECTION HAND CAR.

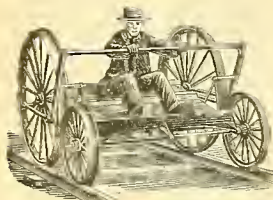


Fig. 1711.  
EXPRESS HAND CAR.



Fig. 1712.  
"SHEFFIELD" THREE-WHEELED HAND CAR.  
Weight, about 100 lbs.

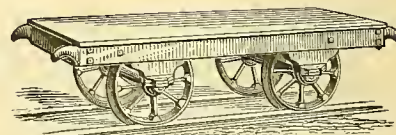


Fig. 1713.  
PUSH CAR.

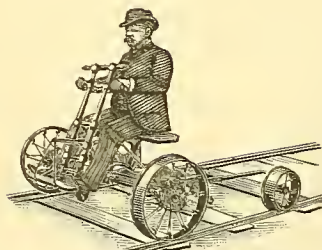


Fig. 1714.  
"KALAMAZOO" THREE-WHEELED HAND CAR.

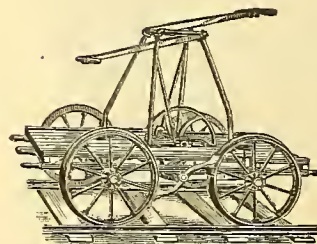


Fig. 1715.  
"KALAMAZOO" LEVER HAND CAR.  
(Shown in detail in Figs. 1724-1726.)



Fig. 1716.  
"CROSSMAN" HAND CAR.

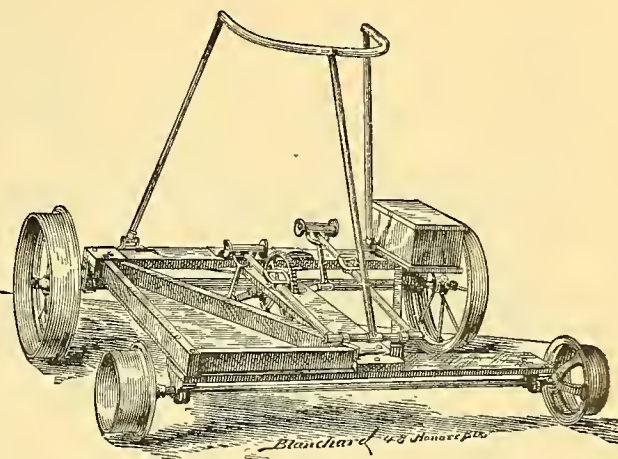


Fig. 1717.  
JEFFREY "RAILROAD SPEEDER."

No.	Kind of Car.	Wheels.	Gearing.	Weight.
1.	Light Section.	24 in.	Slow or medium.	600 lbs.
2.	Heavy Section.	18 in.	Slow.	775 "
3.	Light Telegraph.	24 in.	Fast.	425 "
4.	Light Telegraph.	24 in.	Fast, with friction rollers.	450 "

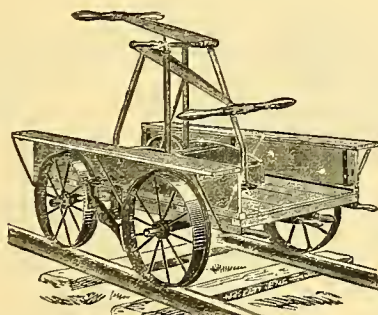


Fig. 1718.  
"KALAMAZOO" HAND CAR (Narrow-gauge), with gas-pipe LEVER-FRAME.  
(Brake applied inside the RAVES.)

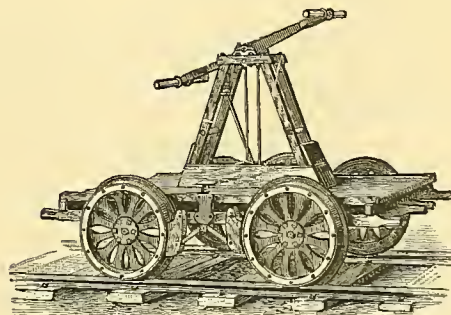
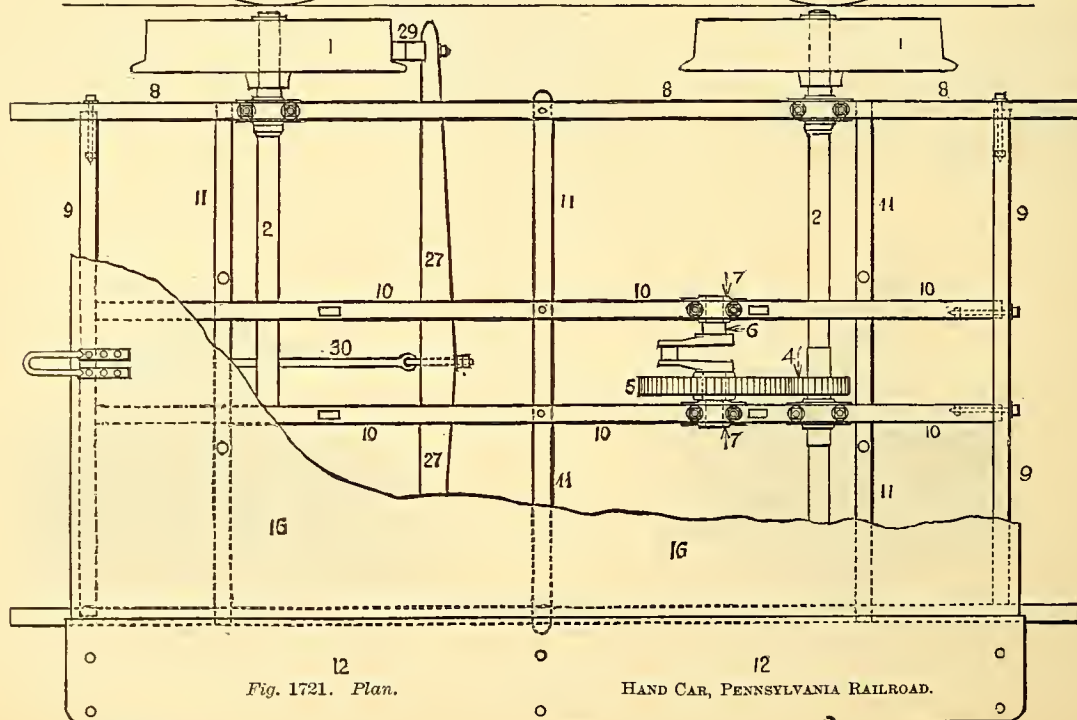
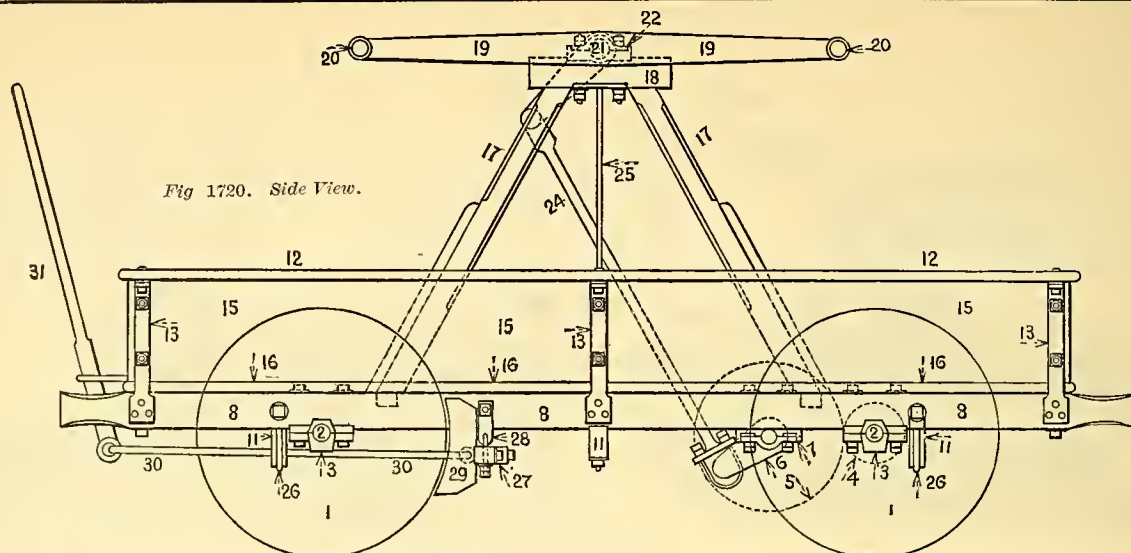


Fig. 1719.  
"SHEFFIELD" WOODEN-WHEEL HAND CAR.





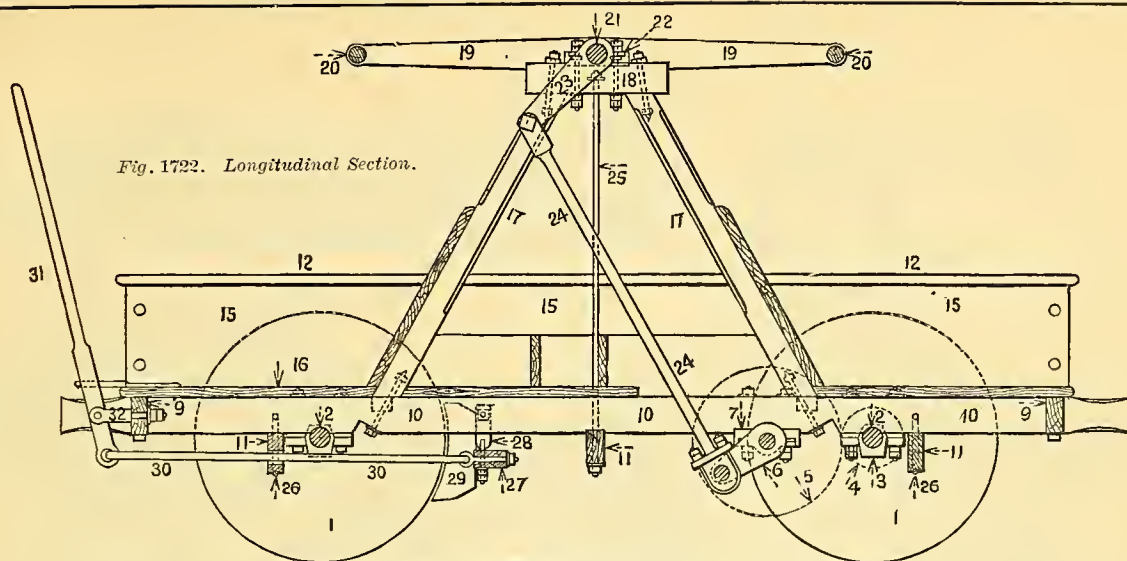
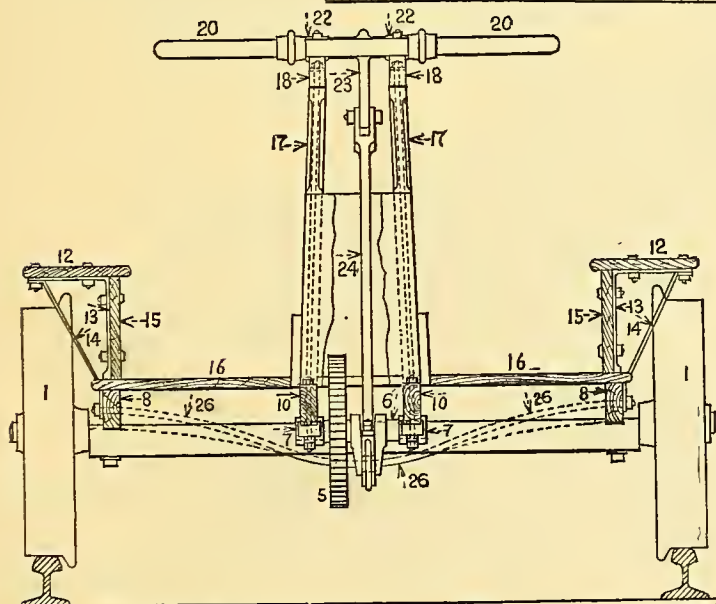


Fig. 1722. Longitudinal Section.

Scale. 1 2 3 4 5 ft.



NAMES OF PARTS OF HAND-CAR; Fig. 1720-23.

- |   |                           |
|---|---------------------------|
| 1. Wheel.                                   | 16. Floor.                |
| 2. Axle.                                    | 17. Lever-frame Post.     |
| 3. Journal-box.                             | 18. Lever-frame Cap.      |
| 4. Pinion.                                  | 19. Hand-car Lever.       |
| 5. Gear-wheel.                              | 20. Lever-handle.         |
| 6. Crank-shaft.                             | 21. Lever-shaft.          |
| 7. Crank-shaft Bearings.                    | 22. Lever-shaft Bearings. |
| 8. Side-sills.                              | 23. Bell-crank.           |
| 9. End-sills.                               | 24. Connecting-rod.       |
| 10. Centre-sills.                           | 25. Lever-frame Tie-rod.  |
| 11. Cross-frame Tie-timber, or Needle-beam. | 26. Hand-car Truss-rod.   |
| 12. Seat.                                   | 27. Brake-beam.           |
| 13. Seat-bracket.                           | 28. Brake-beam Hanger.    |
| 14. Seat-bracket Brace.                     | 29. Brake-head.           |
| 15. Rave, or Seat-riser.                    | 30. Brake-rod.            |
|   | 31. Brake-lever.          |
|   | 32. Brake-lever Fulcrum.  |

Fig. 1723. Transverse Section.

HAND CAR, PENNSYLVANIA RAILROAD.

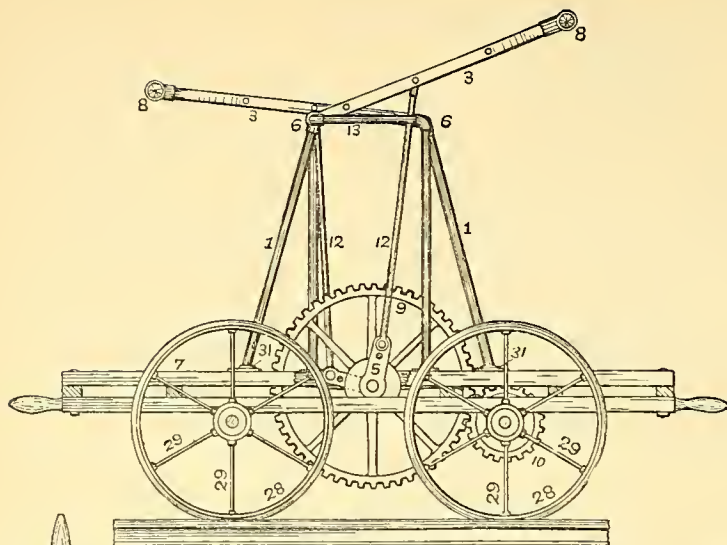


Fig. 1724. Side Elevation.

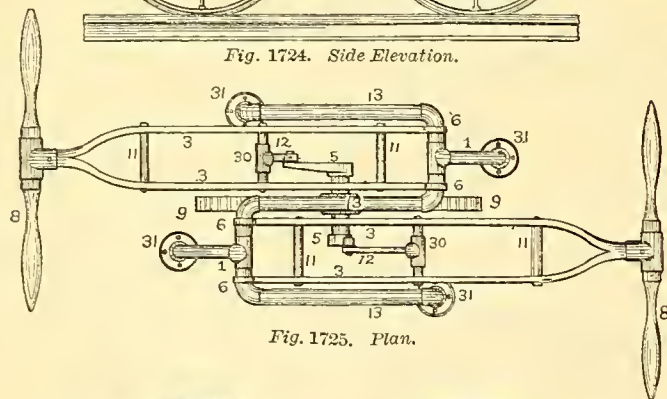


Fig. 1725. Plan.

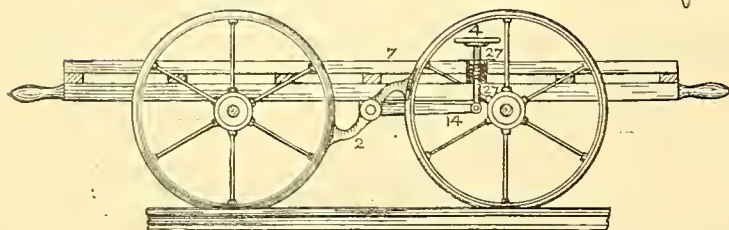


Fig. 1726. Brake Gear.  
"KALAMAZOO" LEVER HAND-CAR.

NAMES OF PARTS; Figs. 1724-1726.

1. Lever-posts.
2. S-brake on the Brake-axle.
3. Propelling-levers, or Hand-car Levers.
4. Brake-treadle.
5. Crank, with Adjusting-holes and Crank-shaft.
6. Propelling-lever Fulcrum.
7. Side-rail over the Side-sill.
8. Propelling-lever Handles.
9. Spur-wheel, or Gear-wheel. } Driving Gear.
10. Pinion.
11. Propelling-lever Brace-rods.
12. Connecting-rod.
13. Lever-frame.
14. Brake-lever.
27. Brake-lever Pintle.
28. Tire.
29. Spokes.
31. Lever-post Base.



Fig. 1727. EXTENSION-REACH, EIGHT-WHEEL LOGGING CAR.

(Narrow-gauge, Extra Heavy.)

[No. 4.]

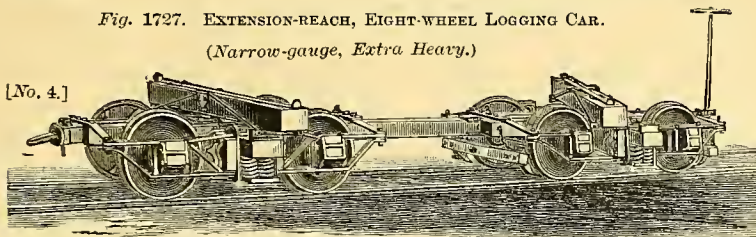


Fig. 1728. EXTENSION-REACH, EIGHT-WHEEL LOGGING CAR.

(Standard Gauge.)

(No. 2, similar, but Narrow-gauge.)

[No. 5.]

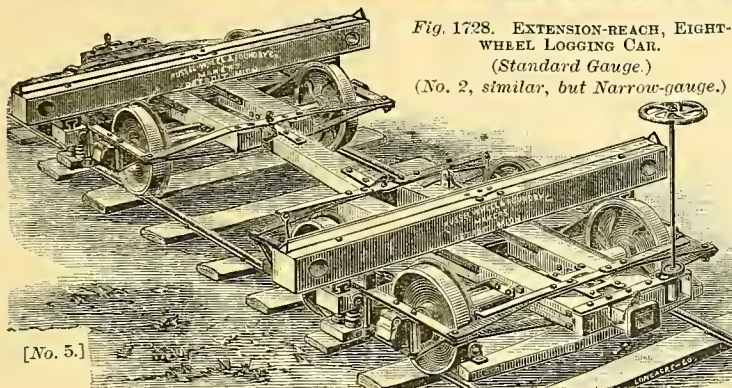
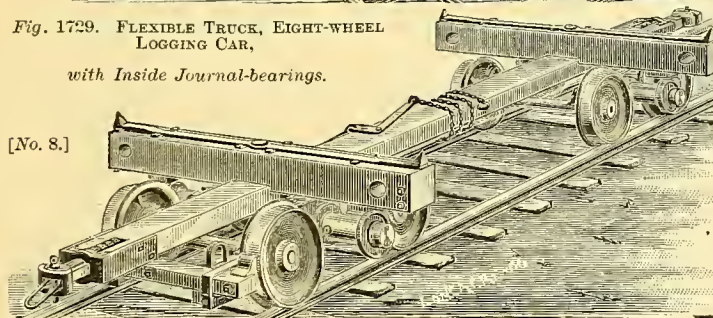


Fig. 1729. FLEXIBLE TRUCK, EIGHT-WHEEL LOGGING CAR,

with Inside Journal-bearings.

[No. 8.]



(No. 11, similar to No. 10 but shorter.)

[No. 10.]

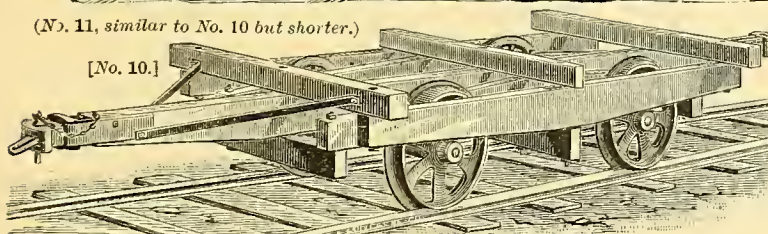


Fig. 1730. FLEXIBLE-FRAME LUMBER LARRY.

Capacity, 3,000 ft. B. M.

Weight, 6,200 lbs.

Height, 27 in.

Length, 21 ft. over all.

Wheels, 24 in., chilled, 325 lbs.

Bearing Springs, 20 tons capacity.

Axles, forged,  $3\frac{1}{4}$  in. centre,  $4\frac{1}{2}$  in. wheel seat.Journal Brasses, 3 in. x  $5\frac{1}{2}$  in.Bunks, 6 in. x 10 in. x 8 ft., trussed with two  $\frac{3}{4}$ -in. round rods.Truck-frames, 3 in. x  $\frac{3}{4}$  in., 3 in. x  $\frac{3}{4}$  in. and 3 in. x  $\frac{1}{2}$  in.

Wheel-base, of truck, 3 ft. 6 in.; of car, 14 ft. 6 in.

Capacity, 2,500 ft. B. M.

Weight, 5,600 lbs.

Height, 27 in.

Length, 21 ft. over all.

Wheels, 24 in. chilled, 265 lbs.

Bearing Springs, 20 tons capacity.

Axles, forged,  $3\frac{1}{4}$  in. centre,  $3\frac{3}{4}$  in. wheel seat.Journal Brasses, 3 in. x  $5\frac{1}{2}$  in.

Journal Boxes, Hewitt Patent Cover.

Bunks, 8 in. x 10 in. x 9 ft. placed to come 10 ft. 6 in. apart.

Truck-frames,  $2\frac{1}{2}$  in. x  $\frac{7}{8}$  in.,  $2\frac{1}{2}$  in. x  $\frac{3}{4}$  in. and  $2\frac{1}{2}$  in. x  $\frac{1}{2}$  in.

Wheel-base, of truck, 3 ft. 2 in.; of car, 13 ft. 8 in.

Draft Link, 18 in. above track.

Capacity, 1,500 ft. B. M.

Weight, 4,000 lbs.

Height, 24 in.

Length, 21 ft. over all.

Wheels, 20 in. chilled, 200 lbs.

Axles,  $2\frac{3}{4}$  in., rolled.

Journal Boxes, babbited (oil chamber below).

Bunks, 8 in. x 10 in. x 7 ft., placed 10 ft. 6 in. apart (centres).

Wheel-base, of truck, 3 ft.; of car, 13 ft. 6 in.

Capacity, 2,000 ft. B. M.

Weight, 1,500 lbs.

Height, 25 in.

Length, 18 ft. over all.

Wheels, 22 in. chilled, 150 lbs.

Axles,  $2\frac{1}{2}$  in., rolled.

Journal Boxes, inside bearing, with oil chamber.

Journal Brasses, rocking,  $2\frac{1}{2}$  in. x  $4\frac{1}{2}$  in.Bunks,  $4\frac{1}{2}$  in. x 5 in. x 5 ft., placed 8 ft. 10 in. apart (centres).

Wheel-base, 5 ft., one wheel loose on each axle.



Fig. 1731.  
JOURNAL-BOX.



Fig. 1732.  
JOURNAL-BOX  
LID.



Fig. 1733.  
JOURNAL-  
BEARING.



Fig. 1734.  
SLIDE.

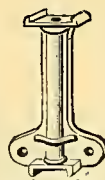


Fig. 1735.  
STANDARD, OR COLUMN.

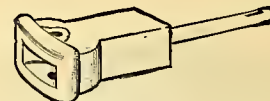


Fig. 1736.  
DRAWBAR.



Fig. 1737.  
LOWER SIDE-  
BEARING.



Fig. 1738.  
TOP SIDE-  
BEARING.



Fig. 1739.  
TOP CENTRE-PLATE.



Fig. 1740.  
BOTTOM CENTRE-PLATE.



Fig. 1741.  
FOLLOWER-PLATE.



Fig. 1742.  
FOLLOWER-LUG.



Fig. 1743.  
BOLSTER TRUSS-  
ROD WASHER.



Fig. 1744.  
BOLSTER TRUSS-  
ROD SADDLE.



Fig. 1745.  
BRAKE-HEAD.



Fig. 1746.  
BRAKE-SHOE.



Fig. 1747.  
BRAKE-LEVER  
JAW.



Fig. 1748.  
BRAKE-SPOOL.

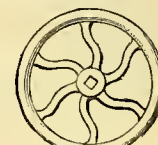


Fig. 1749.  
BRAKE-WHEEL.

CASTINGS FOR LOGGING CAR, Fig. 1728 (Nos. 2 and 5).



Fig. 1750.  
PEDESTAL.



Fig. 1751.  
JOURNAL-BOX.



Fig. 1752.  
BRASS.



Fig. 1753.  
BRAKE-HEAD.



Fig. 1754.  
BRAKE-SHOE.



Fig. 1755.  
BOLSTER TRUSS-  
WASHER.



Fig. 1756.  
BOLSTER TRUSS-  
SADDLE.

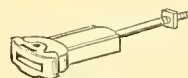


Fig. 1757.  
DRAWBAR.



Fig. 1758.  
DRAFT-SHEAVE AND HOLDER.



Fig. 1759.  
DRAWBAR WASHER.



Fig. 1760.  
BOLSTER-RING.



Fig. 1761.  
TOP SIDE-BEARING.



Fig. 1762.  
LOWER SIDE-BEARING.

CASTINGS FOR LOGGING CAR, Fig. 1729 (No. 8).

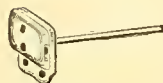


Fig. 1763.  
BUFFER.



Fig. 1764.  
DRAFT-SHEAVE AND HOLDER.



Fig. 1765.  
JOURNAL-BOX.



Fig. 1766.  
BRASS.



Fig. 1767.  
STAKE-POCKET.



Fig. 1768.  
UNIVERSAL-JOINT.

CASTINGS FOR FLEXIBLE-FRAME LUMBER LARRY; Fig. 1730 (No. 10).



Fig. 1769.  
DRAWBAR.



Fig. 1770.  
BUMPER-GUIDE.



Fig. 1771.  
BUMPER-WASHER.



Fig. 1772.  
JOURNAL-BOXES.  
Outside-bearing.



Fig. 1773.  
JOURNAL-BOXES.  
Inside-bearing.



Fig. 1774.  
BRAKE-SHOE.

CASTINGS FOR LUMBER LARRY (No. 11).



Fig. 1775. BUNK STRAP.

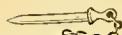


Fig. 1776. LINK-PIN.



Fig. 1784. BRAKE CONNECTING-ROD.

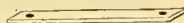


Fig. 1777. FOLLOWER-PLATE GUIDE.

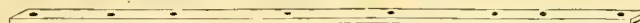


Fig. 1785. TOP ARCH-BAR (No. 5 Truck).



Fig. 1794. BRAKE-LEVER.



Fig. 1778. DOUBLE-TRUSS WASHER.

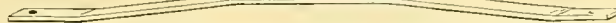


Fig. 1786. CROSS-PIECE (No. 5 Truck).

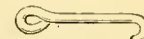


Fig. 1795. BRAKE-HANGE.

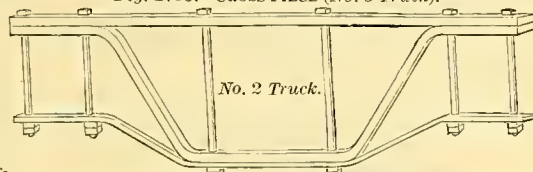
Fig. 1779. DIAGONAL BRACE.  
(No. 5 Truck)

Fig. 1782. TOP, MIDDLE AND BOTTOM ARCH BARS.

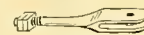
Fig. 1798.  
DUST-GUARD.

Fig. 1796. JAW-BOLT.

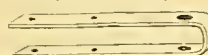
Fig. 1780. REACH-END.  
(No. 5 Truck)Fig. 1787.  
DOUBLE BRAKE-  
EQUALIZER.

Fig. 1797. EYE-BOLT.

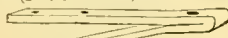


Fig. 1781. EXTENSION REACH-END.

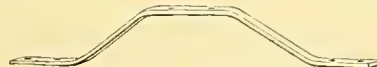


Fig. 1789. BUNK-TRUSS.

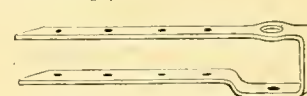


Fig. 1800. BRAKE-SPOOL STEP.



Fig. 1782. BUFFER-STRAP.

Fig. 1790. END SUPPORT (No. 5 Truck).

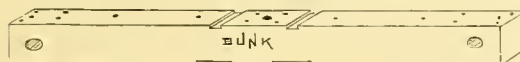
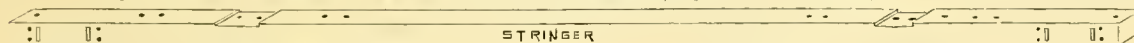
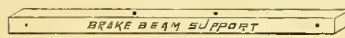
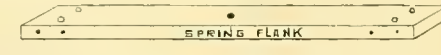
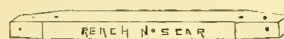
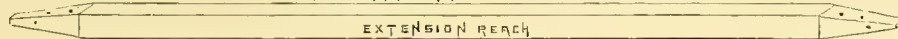
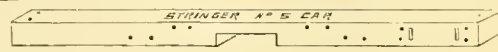


Fig. 1783. CENTRE PIN.

Fig. 1791. BOLSTER TRUSS-ROD.

Figs. 1775-1801. FORGINGS AND WROUGHT-IRON FOR LOGGING-CAR, Fig. 1728 (Nos. 2 and 5).

Fig. 1801. BRAKE MAST.

MIDDLE TRUSS SUPPORT  
N° 5 BRAKE CAREND TRUSS SUPPORT  
N° 2 BRAKE CAR

Figs. 1802-1814. WOODWORK DETAILS FOR LOGGING-CARS, Figs. 1727-1728 (Nos. 2, 4 and 5).

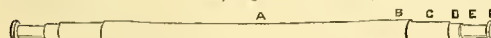
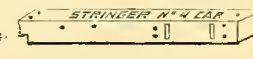


Fig. 1810. AXLE (Standard Gauge).



Fig. 1817. BEARING-SPRING.



Fig. 1818. HALF-ELLIPTIC SPRING.

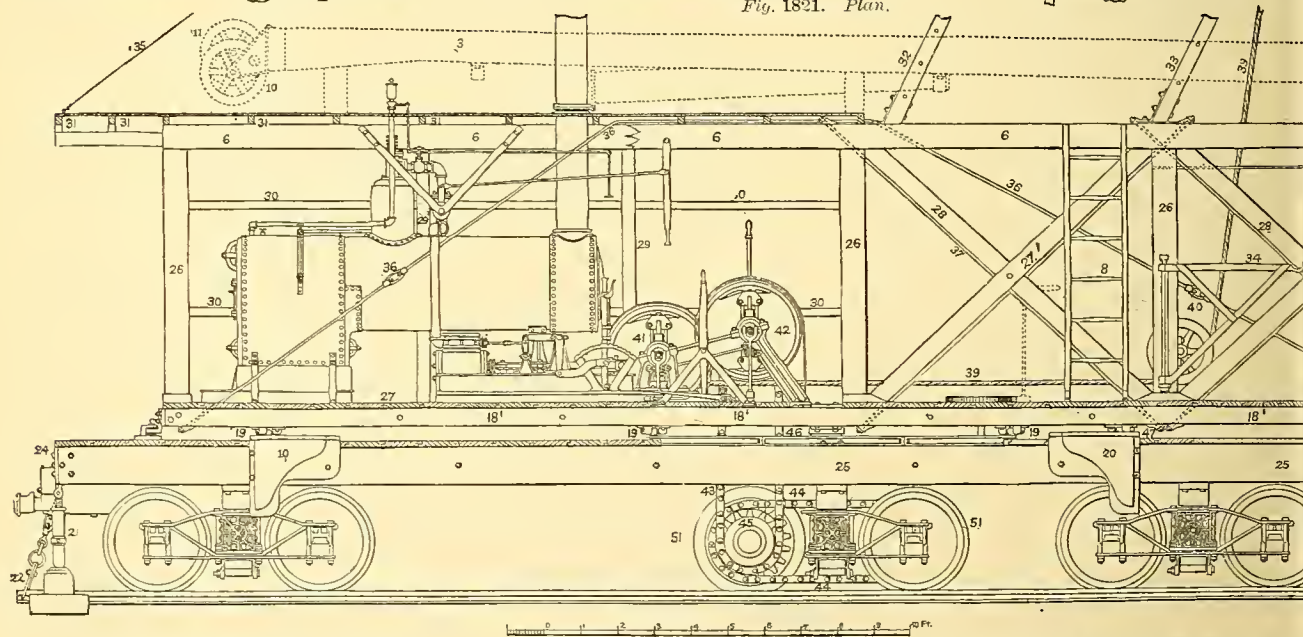
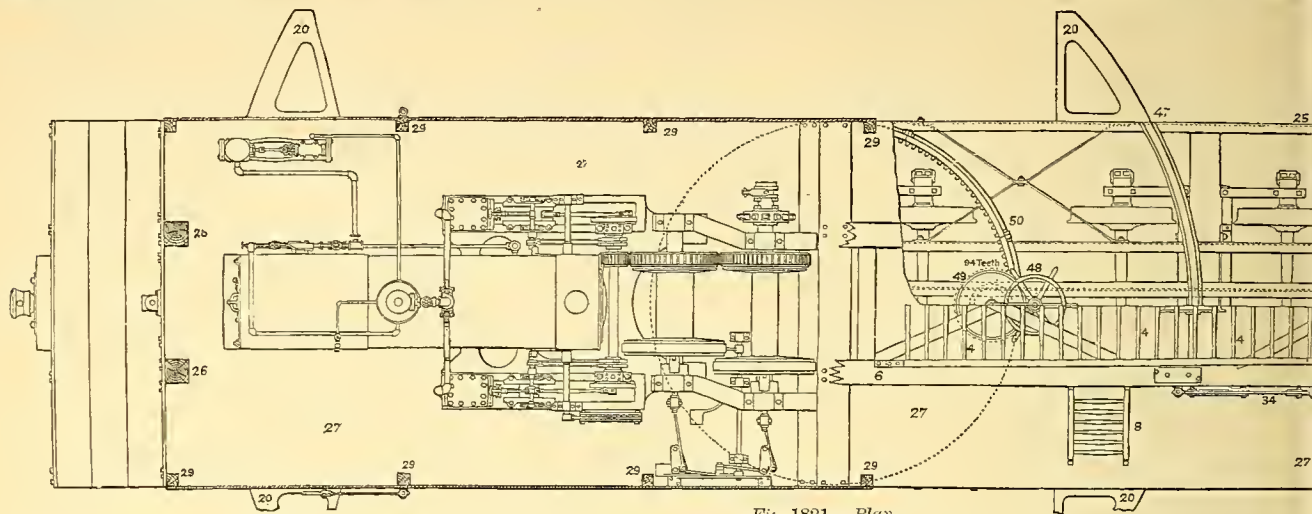


Fig. 1819. ELLIPTIC SPRING.



Fig. 1820. BUFFER SPRING.





Crane (34), (front), Weight 80 lbs.  
 " (rear), " 40 lbs.  
 Capacity, 1,700 lbs.

Fig. 1822. Side Elevation. PILE-DRIVER CAR, FLINT & PERE MARQUETTE RAILWAY.

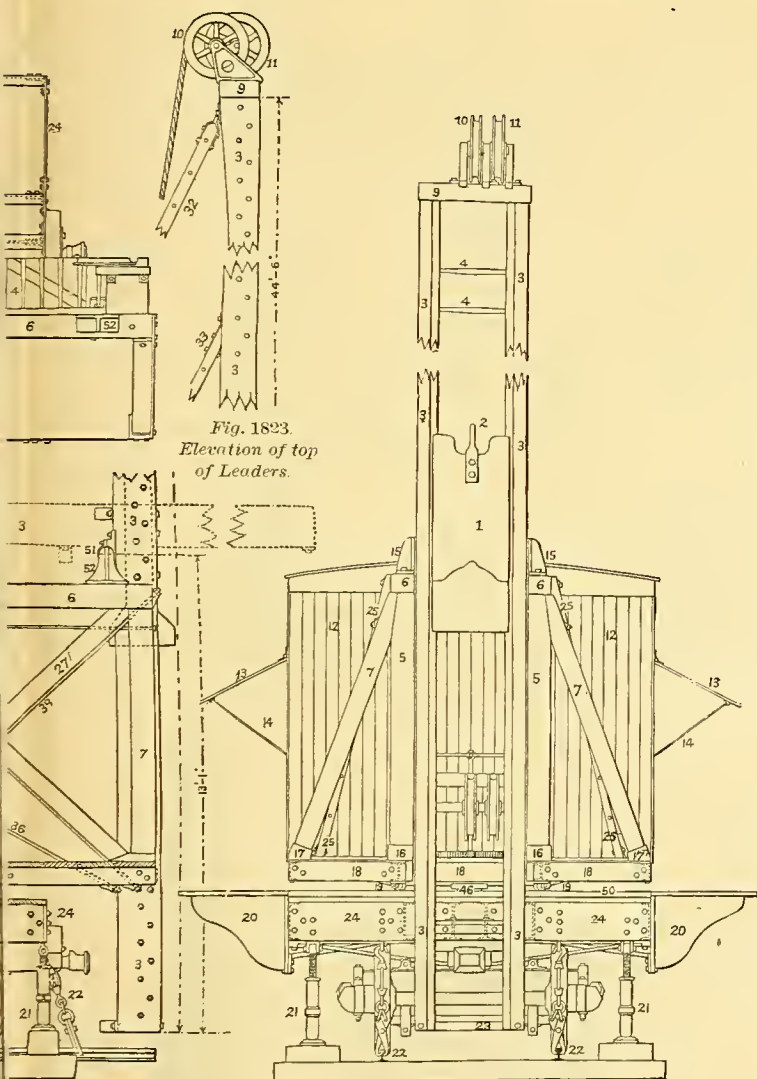


Fig. 1823.  
Elevation of top  
of Leaders.

Fig. 1824. End Elevation.

NAMES OF PARTS ; Figs. 1821-1824.

- |  |   |
|--|---|
| 1. Hammer, lifted by Shears.   | 27'. Body-brace.  |
| 2. Hammer-eye, or Clevis.  | 28. Body Counter-brace.   |
| 3. Leaders.  | 29. Cabin Studding.   |
| 4. Stringer Sway braces (and Main Ladder 32.)                            | 30. Cabin Seantling.  |
| 5. Pilasters.  | 31. Carline.  |
| 6. Top stringers.  | 32. Main Ladder, swinging on Ladder-trunnions.                      |
| 7. Leader-brace.   | 33. Lower Ladder.   |
| 8. Cabin Ladder.   | 34. Crane.  |
| 9. Leader Cap.   | 35. Guy-rope.   |
| 10. Main Sheave.   | 36. Hog-chain.  |
| 11. Pile-hoisting Sheave.  | 37. Truss Rod.  |
| 12. Sheathing, of Cabin.   | 38. Counterbrace Rod.   |
| 13. Cabin-shutter.   | 39. Hammer-rope.  |
| 14. Cabin Shutter-brace.   | 40. Hammer-rope Pulley.   |
| 15. Leader-trunnion Pedestal.  | 41. { Spools controlled by Strap-brake and Treadle. } Winding Gear. |
| 16. Pilaster-pockets.  | 42. { }   |
| 17. Leader-brace Pocket.   | 43. Driving { Chain. } Pitch Chains.                                |
| 18. Swinging Platform End-sill.  | 44. Connecting { Chain. }   |
| 18'. Swinging-platform Sill.   | 45. Pitch-gear.   |
| 19. Main Rollers.  | 46. Swinging-platform Centre-plate (upper and lower).               |
| 20. Wings (front and back).  | 47. Traek.  |
| 21. Jack-screw, working on a Jack-screw Pin attached to body.            | 48. { Hand-wheel. } Slewing Gear.                                   |
| 22. Tongs, or Crabs.   | 49. { Spur-wheel. }   |
| 23. Leader Cross piece.  | 50. Slewing-rack.   |
| 24. End-sill.  | 51. Leader Trunnion.  |
| 25. (Fig. 1821.) Outside Sills (Channel Bars). (Fig. 1824.) Leader-stay. | 52. Leader-trunnion Pedestal.                                       |
| 26. Main Posts.  |   |
| 27. Swinging-platform, or Upper Platform.                                |   |

Leaders, to take in 40 ft. pile.  
Hammer, 4,500 lbs.

Thielsen trucks (front truck removable). Motive power sufficient to propel car and two loaded cars attached. Fuel and water carried on a small locomotive tender.





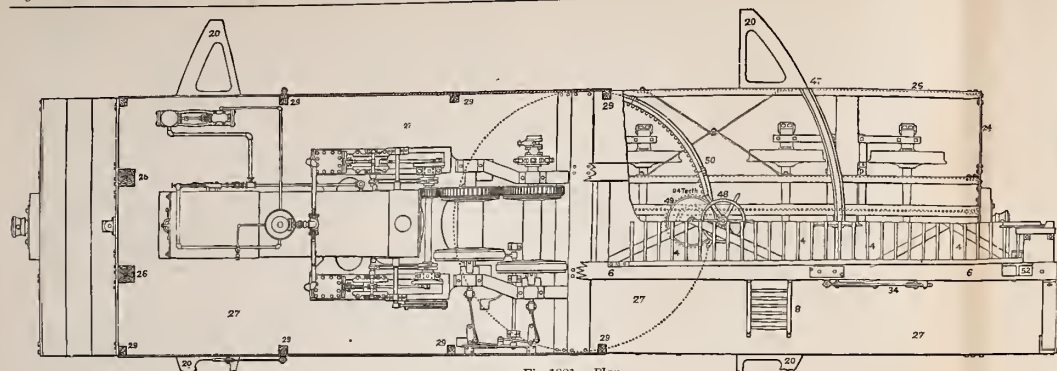


Fig. 1821. Plan.

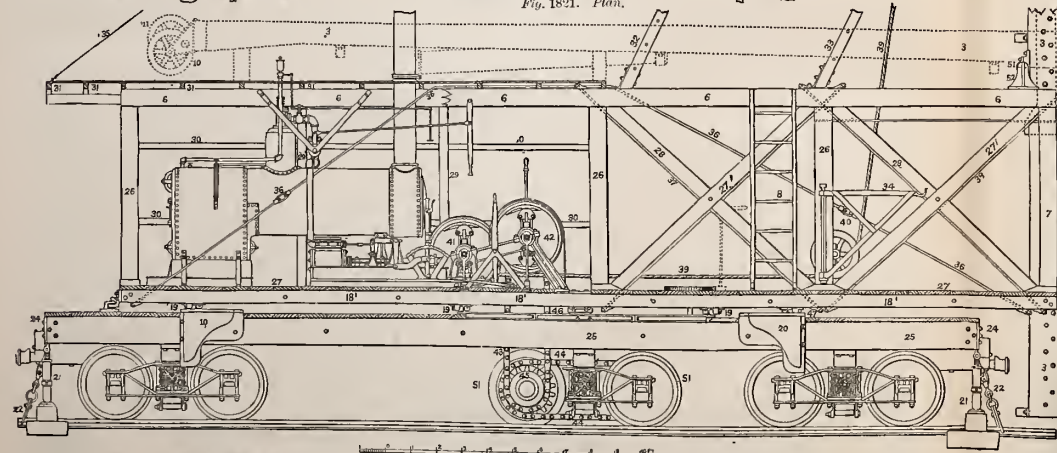


Fig. 1822. Side Elevation. PILE-DRIVER CAR, FLINT &amp; PERE MARQUETTE RAILWAY.

Crane (34), (front), Weight 80 lbs.  
 " (rear), " 40 lbs.  
 Capacity, 1,700 lbs.

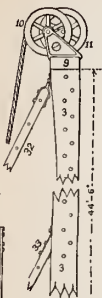
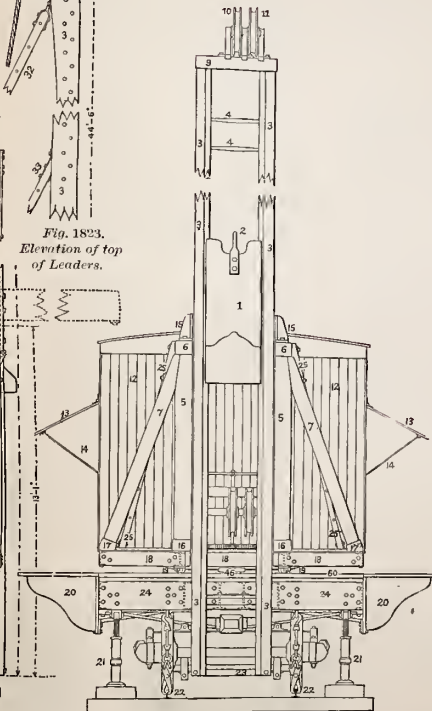
Fig. 1823.  
Elevation of top  
of Leaders.

Fig. 1824. End Elevation.

## NAMES OF PARTS; Figs. 1821-1824.

- |   |   |
|---|---|
| 1. Hammer, lifted by Shears.                                  | 27'. Body-brace.                                      |
| 2. Hammer-eye, or Clevis.                                     | 28. Body Counter-brace.                               |
| 3. Leaders.   | 29. Cabin Studding.                                   |
| 4. Stringer Stay braces (and Main Ladder 32.)                 | 30. Cabin Scantling.                                  |
| 5. Pilasters.   | 31. Carline.  |
| 6. Top stringers.   | 32. Main Ladder, swinging on Ladder-trunnions.        |
| 7. Leader-brace.  | 33. Lower Ladder.                                     |
| 8. Cabin Ladder.  | 34. Crane.  |
| 9. Leader Cap.  | 35. Guy-rope.   |
| 10. Main Sheave.  | 36. Hog-chain.  |
| 11. Pile-hoisting Sheave.                                     | 37. Truss Rod.  |
| 12. Sheathing, of Cabin.                                      | 38. Counterbrace Rod.                                 |
| 13. Cabin-shutter.  | 39. Hammer-rope.                                      |
| 14. Cabin Shutter-brace.                                      | 40. Hammer-rope Pulley.                               |
| 15. Leader-trunnion Pedestal.                                 | 41. Spools controlled by Strap-brake and Treadle.     |
| 16. Pilaster-pockets.   | 42. { } Winding Gear.                                 |
| 17. Leader-brace Pocket.                                      | 43. Driving { } Chain. Pitch Chains.                  |
| 18. Swinging Platform End-sill.                               | 44. Connecting Chain.                                 |
| 18'. Swinging-platform Sill.                                  | 45. Pitch-gear.                                       |
| 19. Main Rollers.   | 46. Swinging-platform Centre-plate (upper and lower). |
| 20. Wings (front and back).                                   | 47. Truck.  |
| 21. Jack-screw, working on a Jack-screw Pin attached to body. | 48. { Hand-wheel. } Steering Gear.                    |
| 22. Tongs, or Crabs.  | 49. { Spur-wheel. } Gear.                             |
| 23. Leader Cross-piece.                                       | 50. Slewing-rack.                                     |
| 24. End-sill.   | 51. Leader Trunnion.                                  |
| 25. (Fig. 1821.) Outside Sills (Chunnel Bars).                | 52. Leader-trunnion Pedestal.                         |
| 26. Main Posts.   |   |
| 27. Swinging-platform, or Upper Platform.                     |   |

Leaders, to take in 40 ft. pile.

Hammer, 4,500 lbs.

Thielsen trucks (front truck removable). Motive power sufficient to propel car and two loaded cars attached. Fuel and water carried on a small locomotive tender.



Fig. 1825.  
TEST BAR FOR LIMIT-  
GAUGES.

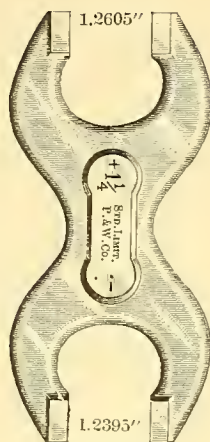


Fig. 1826.  
M. C. B. STANDARD  
LIMIT-GAUGE.  
(For  $1\frac{1}{4}$  in. round iron.  
See Dictionary for table  
of other standard Limit-  
gauges.

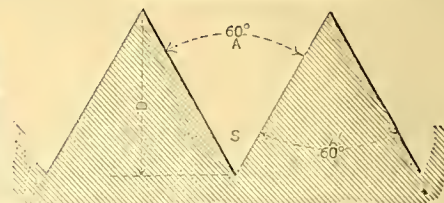
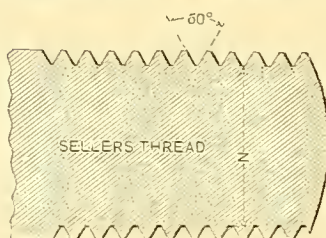
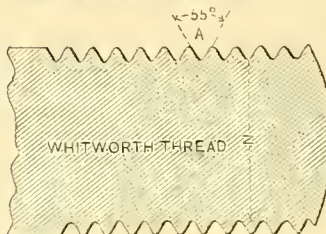


Fig. 1827. V SCREW-THREAD.

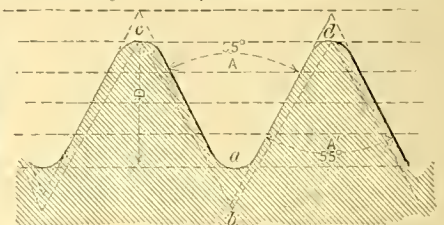


Fig. 1828. WHITWORTH STANDARD SCREW-THREADS.  
English and Continental standard.

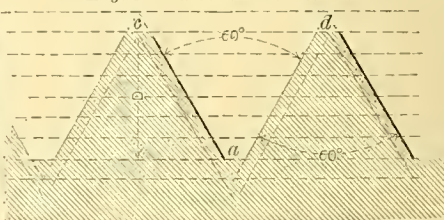


Fig. 1729. SELLERS' STANDARD SCREW-THREADS.  
U. S. and M. C. B. standard.

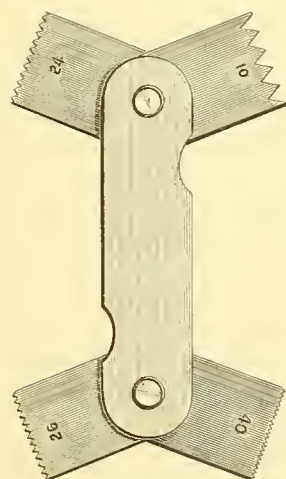


Fig. 1831. SCREW-PITCH GAUGE.

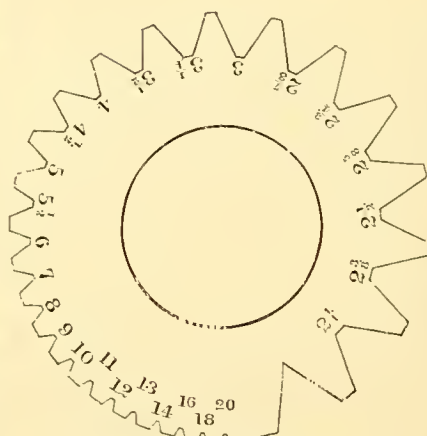


Fig. 1830. SCREW-THREAD GAUGE.

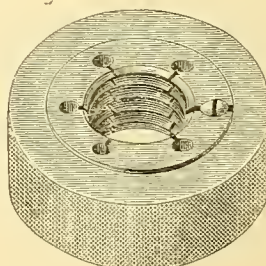


















Fig. 1832.  
EXTERNAL SCREW-GAUGE.



Fig. 1833.  
INTERNAL SCREW-  
GAUGE.



MASTER CAR-BUILDERS' STANDARD DIMENSIONS FOR BOLTS AND NUTS (SELLERS STANDARD THREADS).

Diam. of Screw.	Threads per inch.	Diameter at root of Thread.	Area of Bolt at root of Thread.	Width of Flat.	Short Diam. Rough.	Short Diam. Finish.	Long Diam. Rough.	Long Diam. Finish.	Thick-ness Rough.	Thick-ness Finish.	Short Diam. Rough.	Short Diam. Finish.	Long Diam. Rough.	Long Diam. Finish.	Thick-ness Rough.	Thick-ness Finish.
																
$\frac{1}{8}$	20	.185	$\frac{1}{16}$	.0062	$\frac{1}{8}$	$\frac{7}{16}$	$\frac{3}{4}$	$\frac{7}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	$\frac{1}{8}$	$\frac{1}{8}$
$\frac{1}{4}$	18	.240	$\frac{1}{8}$	.0074	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{4}$
$\frac{3}{8}$	16	.294	$\frac{3}{8}$	.0078	$\frac{3}{8}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{8}$	$\frac{3}{8}$
$\frac{1}{2}$	14	.344	$\frac{1}{2}$	.0089	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{1}{2}$	$\frac{1}{2}$
$\frac{5}{8}$	13	.400	$\frac{5}{8}$	.0096	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{5}{8}$	$\frac{5}{8}$
$\frac{3}{4}$	12	.454	$\frac{3}{4}$	.0104	$\frac{3}{4}$	$\frac{7}{8}$	$\frac{7}{8}$	$\frac{7}{8}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{7}{8}$	$\frac{7}{8}$	$\frac{3}{4}$	$\frac{3}{4}$
$\frac{7}{8}$	11	.507	$\frac{7}{8}$	.0113	$\frac{7}{8}$	$1$	$1$	$1$	$\frac{7}{8}$	$\frac{7}{8}$	$\frac{7}{8}$	$\frac{7}{8}$	$1$	$1$	$\frac{7}{8}$	$\frac{7}{8}$
$1$	10	.620	$1$	.0125	$1$	$1\frac{1}{8}$	$1\frac{1}{8}$	$1\frac{1}{8}$	$1$	$1$	$1$	$1$	$1\frac{1}{8}$	$1\frac{1}{8}$	$1$	$1$
$1\frac{1}{8}$	9	.731	$1\frac{1}{8}$	.0138	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{1}{4}$	$1\frac{1}{4}$	$1\frac{1}{8}$	$1\frac{1}{8}$	$1\frac{1}{8}$	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{1}{4}$	$1\frac{1}{8}$	$1\frac{1}{8}$
$1\frac{1}{4}$	8	.837	$1\frac{1}{4}$	.0156	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{3}{8}$	$1\frac{3}{8}$	$1\frac{1}{4}$	$1\frac{1}{4}$	$1\frac{1}{4}$	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{3}{8}$	$1\frac{1}{4}$	$1\frac{1}{4}$
$1\frac{3}{8}$	7	.940	$1\frac{3}{8}$	.0178	$1\frac{3}{8}$	$1\frac{7}{8}$	$1\frac{7}{8}$	$1\frac{7}{8}$	$1\frac{3}{8}$	$1\frac{3}{8}$	$1\frac{3}{8}$	$1\frac{3}{8}$	$1\frac{7}{8}$	$1\frac{7}{8}$	$1\frac{3}{8}$	$1\frac{3}{8}$
$1\frac{1}{2}$	7	1.065	$1\frac{1}{2}$	.0178	2	$1\frac{7}{8}$	$2$	$2$	$1\frac{1}{2}$	$1\frac{1}{2}$	2	$1\frac{1}{2}$	$2$	$2$	2	$1\frac{1}{2}$
$1\frac{3}{4}$	6	1.160	$1\frac{3}{4}$	.0208	2	$2\frac{1}{8}$	$2\frac{1}{8}$	$2\frac{1}{8}$	$1\frac{3}{4}$	$1\frac{3}{4}$	2	$1\frac{3}{4}$	$2\frac{1}{8}$	$2\frac{1}{8}$	$2\frac{1}{8}$	$1\frac{3}{4}$
$2$	6	1.284	$2$	.0208	2	$2\frac{1}{4}$	$2\frac{1}{4}$	$2\frac{1}{4}$	$2$	$2$	2	2	$2\frac{1}{4}$	$2\frac{1}{4}$	$2\frac{1}{4}$	$2$
$2\frac{1}{8}$	5	1.389	$2\frac{1}{8}$	.0227	2	$2\frac{3}{8}$	$2\frac{3}{8}$	$2\frac{3}{8}$	$2$	$2$	2	2	$2\frac{3}{8}$	$2\frac{3}{8}$	$2\frac{3}{8}$	$2\frac{1}{8}$
$2\frac{1}{4}$	5	1.491	$2\frac{1}{4}$	.0250	2	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{1}{4}$	$2\frac{1}{4}$	2	2	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{1}{4}$
$2\frac{3}{8}$	5	1.616	$2\frac{3}{8}$	.0250	2	$2\frac{7}{8}$	$2\frac{7}{8}$	$2\frac{7}{8}$	$2\frac{3}{8}$	$2\frac{3}{8}$	2	2	$2\frac{7}{8}$	$2\frac{7}{8}$	$2\frac{7}{8}$	$2\frac{3}{8}$
$2\frac{1}{2}$	4	1.712	$2\frac{1}{2}$	.0277	3	$3\frac{1}{8}$	$3\frac{1}{8}$	$3\frac{1}{8}$	2	$2\frac{1}{2}$	3	3	$3\frac{1}{8}$	$3\frac{1}{8}$	$3\frac{1}{8}$	$2\frac{1}{2}$
$2\frac{3}{4}$	4	1.962	$2\frac{3}{4}$	.0277	3	$3\frac{3}{8}$	$3\frac{3}{8}$	$3\frac{3}{8}$	2	$2\frac{3}{4}$	3	3	$3\frac{3}{8}$	$3\frac{3}{8}$	$3\frac{3}{8}$	$2\frac{3}{4}$
$3$	4	2.176	$3$	.0312	3	$3\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{1}{2}$	2	$2\frac{3}{4}$	3	3	$3\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{1}{2}$	$3$
$3\frac{1}{8}$	4	2.426	$3\frac{1}{8}$	.0312	4	$4\frac{1}{8}$	$4\frac{1}{8}$	$4\frac{1}{8}$	2	$2\frac{1}{2}$	4	4	$4\frac{1}{8}$	$4\frac{1}{8}$	$4\frac{1}{8}$	$3\frac{1}{8}$
$3\frac{1}{4}$	3	2.629	$3\frac{1}{4}$	.0357	4	$4\frac{1}{4}$	$4\frac{1}{4}$	$4\frac{1}{4}$	3	$3\frac{1}{4}$	4	4	$4\frac{1}{4}$	$4\frac{1}{4}$	$4\frac{1}{4}$	$3\frac{1}{4}$
$3\frac{3}{8}$	3	2.879	$3\frac{3}{8}$	.0357	5	$5\frac{1}{8}$	$5\frac{1}{8}$	$5\frac{1}{8}$	3	$3\frac{3}{8}$	5	5	$5\frac{1}{8}$	$5\frac{1}{8}$	$5\frac{1}{8}$	$3\frac{3}{8}$
$3\frac{1}{2}$	2	3.100	$3\frac{1}{2}$	.0384	5	$5\frac{3}{8}$	$5\frac{3}{8}$	$5\frac{3}{8}$	3	$3\frac{1}{2}$	5	5	$5\frac{3}{8}$	$5\frac{3}{8}$	$5\frac{3}{8}$	$3\frac{1}{2}$
$3\frac{3}{4}$	3	3.317	$3\frac{3}{4}$	.0413	5	$5\frac{1}{2}$	$5\frac{1}{2}$	$5\frac{1}{2}$	3	$3\frac{3}{4}$	5	5	$5\frac{1}{2}$	$5\frac{1}{2}$	$5\frac{1}{2}$	$3\frac{3}{4}$
$4$	3	3.567	$4$	.0413	6	$6\frac{1}{8}$	$6\frac{1}{8}$	$6\frac{1}{8}$	4	$4$	6	6	$6\frac{1}{8}$	$6\frac{1}{8}$	$6\frac{1}{8}$	$4$
$4\frac{1}{8}$	2	3.798	$4\frac{1}{8}$	.0435	6	$6\frac{3}{8}$	$6\frac{3}{8}$	$6\frac{3}{8}$	4	$4\frac{1}{8}$	6	6	$6\frac{3}{8}$	$6\frac{3}{8}$	$6\frac{3}{8}$	$4\frac{1}{8}$
$4\frac{1}{4}$	2	4.028	$4\frac{1}{4}$	.0454	6	$6\frac{1}{2}$	$6\frac{1}{2}$	$6\frac{1}{2}$	4	$4\frac{1}{4}$	6	6	$6\frac{1}{2}$	$6\frac{1}{2}$	$6\frac{1}{2}$	$4\frac{1}{4}$
$4\frac{3}{8}$	2	4.256	$4\frac{3}{8}$	.0476	7	$7\frac{1}{8}$	$7\frac{1}{8}$	$7\frac{1}{8}$	4	$4\frac{3}{8}$	7	7	$7\frac{1}{8}$	$7\frac{1}{8}$	$7\frac{1}{8}$	$4\frac{3}{8}$
$5$	2	4.480	$5$	.0500	7	$7\frac{3}{8}$	$7\frac{3}{8}$	$7\frac{3}{8}$	5	$5$	7	7	$7\frac{3}{8}$	$7\frac{3}{8}$	$7\frac{3}{8}$	$5$
$5\frac{1}{8}$	2	4.730	$5\frac{1}{8}$	.0500	8	$8\frac{1}{8}$	$8\frac{1}{8}$	$8\frac{1}{8}$	5	$5\frac{1}{8}$	8	8	$8\frac{1}{8}$	$8\frac{1}{8}$	$8\frac{1}{8}$	$5\frac{1}{8}$
$5\frac{1}{4}$	2	4.953	$5\frac{1}{4}$	.0526	8	$8\frac{3}{8}$	$8\frac{3}{8}$	$8\frac{3}{8}$	5	$5\frac{1}{4}$	8	8	$8\frac{3}{8}$	$8\frac{3}{8}$	$8\frac{3}{8}$	$5\frac{1}{4}$
$5\frac{3}{8}$	2	5.203	$5\frac{3}{8}$	.0526	8	$8\frac{1}{2}$	$8\frac{1}{2}$	$8\frac{1}{2}$	5	$5\frac{3}{8}$	8	8	$8\frac{1}{2}$	$8\frac{1}{2}$	$8\frac{1}{2}$	$5\frac{3}{8}$
$6$	2	5.429	$6$	.0555	9	$9\frac{1}{8}$	$9\frac{1}{8}$	$9\frac{1}{8}$	6	$6$	9	9	$9\frac{1}{8}$	$9\frac{1}{8}$	$9\frac{1}{8}$	$6$

(Square nuts are of the same widths, between parallel faces, as hexagon. The following are the general rules for the dimensions of nuts and bolt-heads on which the above table is based:

Diameter Rough Nut = one and one-half diameter of bolt +  $\frac{1}{8}$ .

" Finished Nut = one and one-half diameter of bolt + 1-16.

" Rough Head = one and one-half diameter of bolt +  $\frac{1}{8}$ .

" Finished Head = one and one-half diameter of bolt + 1-16.

Thickness Rough Nut = diameter of bolt.

" Finished Nut = diameter of bolt - 1-16.

" Rough Head = one-half distance between parallel sides of

" Finished Head = diameter of bolt - 1-16.

[head.



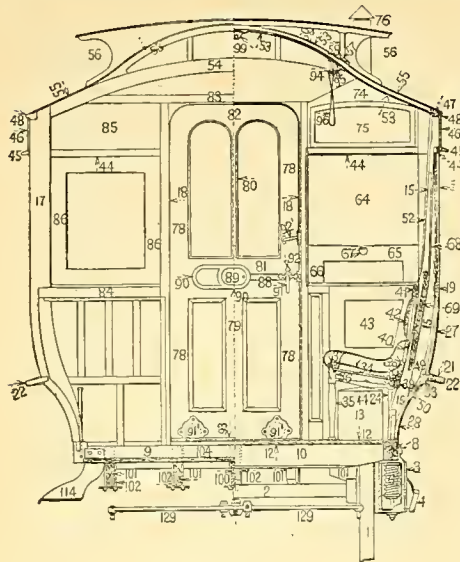


Fig. 1844.

End View, Showing Framing.

## STREET-CAR DETAILS.

Figs. 1844-1845.

(These cuts have been transferred from page E298, where they properly belong, to bring them opposite Fig. 1843.)

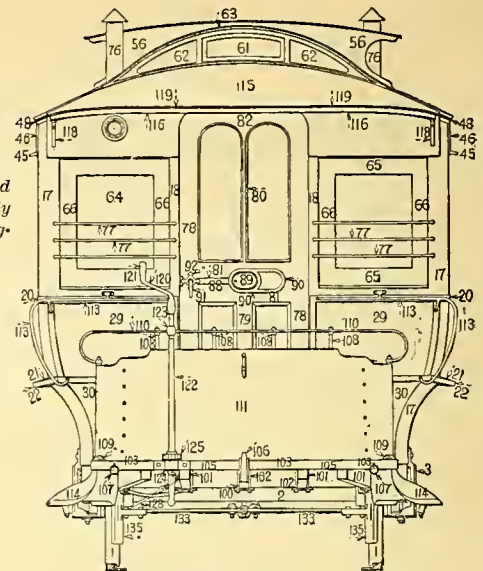


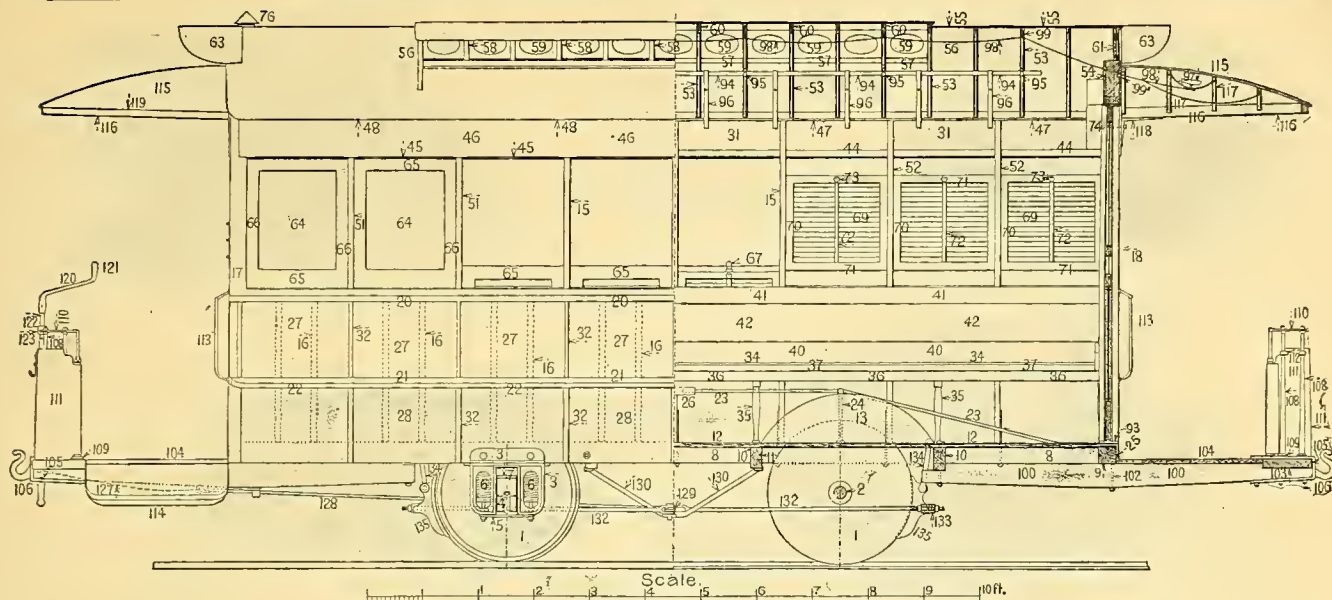
Fig. 1845.

End View.

STREET CAR.

## NAMES OF PARTS OF STREET CARS; Figs. 1843-1846.

- |                              |                               |                             |                             |
|------------------------------|-------------------------------|-----------------------------|-----------------------------|
| 1. Wheel.                    | 20. Belt-rail Band.           | 36. Front Seat-rail.        | 55. Roof-boards.  per-deck+ |
| 2. Axle.                     | 21. Fender-rail.              | 37. Front Seat-bottom-rail. | 56-56. Clear-story, or Up-  |
| 3. Pedestal.                 | 22. Fender-guard.             | 38. Back Seat-bottom-rail.  | 57. Deck Bottom-rail.       |
| 4. Journal-box.              | 23. Inverted Body Truss-rod,  | 39. Back Seat-rail.         | 58. Deck-post.              |
| 5. Jaw-bit.                  | or Hog-chain.                 | 40. Lower Seat-back-rail.   | 59. Deck-window.            |
| 6. Side Journal-spring.      | 24. Inverted Body Queen-      | 41. Upper Seat-back-rail.   | 60. Deck Carline.           |
| 7. Spring-saddle.            | post.                         | 42. Seat-back Board.        | 61. Deck End-ventilator.    |
| 8. Sill.                     | 25. Inverted Truss-rod Plate. | 43. End Seat-panel.         | 62. End Roof-lights.        |
| 9. End-sill.                 | 26. Turnbuckle.               | 44. Upper Belt-rail.        | 63. Ventilator-hood.        |
| 10. Transverse Floor-timber. | 27. Outside-panel.            | 45. Window-ledge.           | 64. Window.                 |
| 11. Sill Tie-rod.            | 28. Lower Outside-panel.      | 46. Letter-board.           | 65. Window-rail.            |
| 12. Floor.                   | 29. Upper End-panel.          | 47. Plate.                  | 66. Window-stile.           |
| 13. Wheel-box.               | 30. Lower End-panel.          | 48. Eaves-moulding.         | 67. Sash-lift.              |
| 14. Wheel-box Button.        | 31. Inside Frieze-panel.      | 49. Window-blind Rest.      | 68. Sash Parting-strip, or  |
| 15. Window-post.             | 32. Panel-strip.              | 50. Window-sash Rest.       | Stop-bead.                  |
| 16. Stud.                    | 33. Panel-furring.            | 51. Outside Window-stop.    | 69. Window-blind.           |
| 17. Corner-post.             | 34. Seat-bottom, and Longi-   | 52. Inside Window-stop.     | 70. Window-blind Stile.     |
| 18. Door-post.               | tudinal Seat.                 | 53. Carline.                | 71. Window-blind Rail.      |
| 19. Belt-rail.               | 35. Seat-leg.                 | 54. End carline.            | 72. Window-blind Mullion.   |



Side View.

Fig. 1843.  
STREET CAR.

Longitudinal Section.

73. Window-blind; Lift.  
74. Lamp-case.  
75. Lamp-case Door.  
76. Lamp-case Chimney.  
77. Window-guards.  
78. Door-stile.  
79. Door-mullion.  
80. Door-window Mullion.  
81. Middle, or Lock Door-rail.  
82. Top Door-rail.  
83. Door-case Top-rail.  
84. Door-case Intermediate-rail.  
85. Door-case Top-panel.  
86. Door-case Sash.  
87. Door-case Sash-button.  
88. Door Guard-band.  
89. Fare-wicket and Fare-wicket Door.  
90. Fare-wicket Door-case.

91. Sliding-door Handle.  
91'. Door-sheave.  
92. Door-latch Plate.  
92'. Sliding-door Holder.  
93. Door-sill.  
94. Inside Hand-rail.  
95. Inside Hand-rail Bracket.  
96. Hand-straps.  
97. Signal-bell.  
98. Bell-strap.  
99. Bell-strap Guide.  
99'. Bell-strap Guide, with Roller.  
100. Draw-timber.  
102. Platform-timber Clamps.  
103. Platform End-timber.  
104. Platform, or Platform-floor.

105. Platform-timber Band.  
106. Draw-hook.  
107. Helper-ring.  
108. Platform-post.  
109. Base-washer, for Platform-post.  
110. Platform-rail.  
111. Dash-guard.  
112. Dash-guard Straps.  
113. Body Hand-rail.  
114. Platform-step, or Side-step.  
115. Platform-hood.  
116. Platform-hood Bow.  
117. Platform - hood Car-line.  
118. Platform-hood Knee.  
119. Platform-hood Moulding.  
120. Brake-shaft Crank.

121. Brake-shaft Crank-handle.  
122. Brake-shaft.  
123. Upper Brake-shaft Bearing.  
124. Lower Brake-shaft Bearing.  
125. Brake Ratchet-wheel.  
126. Brake-pawl.  
127. Brake-shaft Chain.  
128. Brake-shaft Connecting-rod.  
129. Centre Brake-lever.  
130. Centre Brake-lever Spider.  
132. Secondary Brake-rod.  
133. Brake-beam.  
134. Brake-hanger.  
135. Brake-head.  
136. Rubber-tread.



**STREET CARS; General Views.**

*Figs. 1835-1842.*

(The General Views of Street Cars on this page have been moved ahead two pages from their proper position in order to bring Figs. 1843-5 opposite each other.)

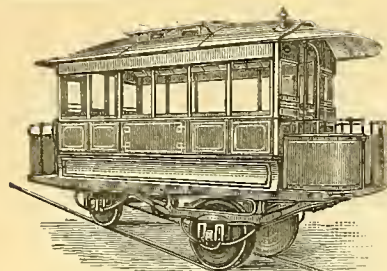


Fig. 1835. INCLINED-PLANE CAR.

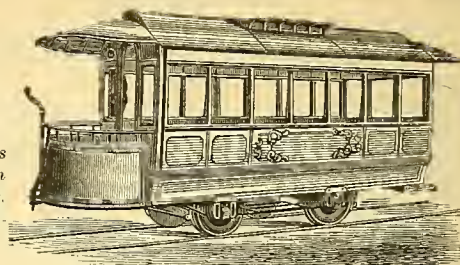


Fig. 1836. FARE-BOX STREET CAR.

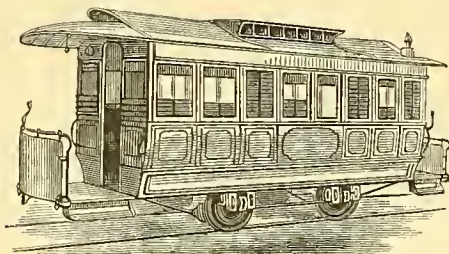


Fig. 1837. TWO-HORSE STREET CAR,  
with two platforms.

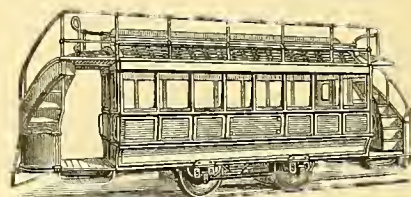


Fig. 1828. DOUBLE-DECK OR TOP-SEAT STREET CAR.

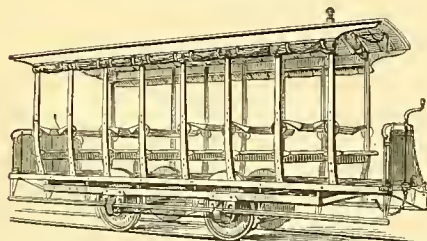


Fig. 1839. SUMMER STREET CAR,  
with reversible seats.

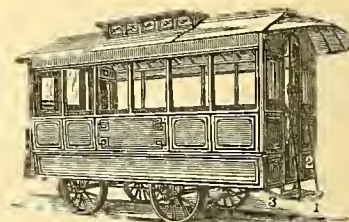


Fig. 1840. ONE-HORSE OR BOB-TAIL STREET CAR.  
1. End-step. 2. Step Hand-rail. 3. Step-iron.

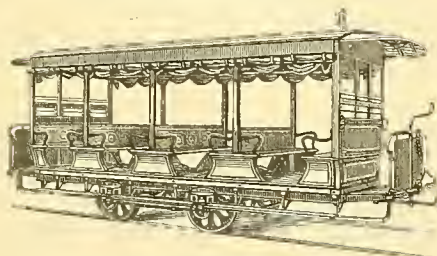


Fig. 1841. SUMMER STREET CAR,  
with seats facing.

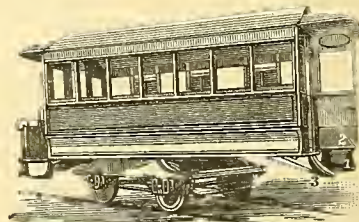
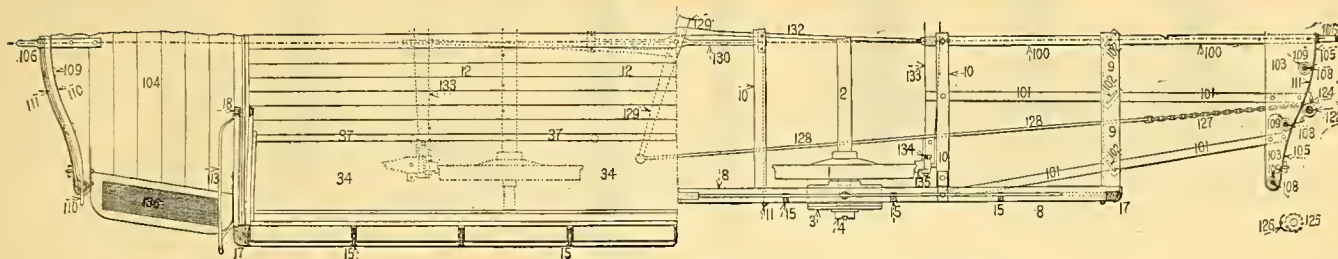


Fig. 1842. REVERSIBLE STREET CAR.  
1. Door-apron. 2. Door Hand-rail. 3. Step-iron.



Numbers refer to List of Names of Parts on preceding page.



Showing Floor, Seats, etc.

Fig. 1846.  
HALF-PLAN OF STREET CAR.

Showing Framing.

### STREET-CAR FURNISHINGS.

(An incomplete presentation of a few only of the more common furnishings.)



Fig. 1847.  
BELL-STRAP GUIDE.



Fig. 1849.  
BELL-STRAP GUIDE, with  
Screw-top.



Fig. 1850.  
BELL-STRAP  
GUIDE,  
with Roller.



Fig. 1851.  
SLIDING-DOOR  
HANDLES.



Fig. 1853.  
SLIDING-DOOR-  
HOLDER CATCH.



Fig. 1848.  
BELL-STRAP GUIDE.



Fig. 1852.  
SLIDING-DOOR HOLDER.



Fig. 1856.  
INSIDE HAND-RAIL  
BRACKET.



Figs. 1857-1858.  
SLIDING-DOOR LATCH  
AND KEEPER.

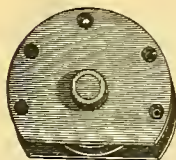


Fig. 1854.  
SLIDING-DOOR SHEAVE.



Fig. 1855.  
SLIDING-DOOR FRICTION-  
ROLLER.



Fig. 1859.  
SIGNAL-BELL.



Fig. 1860.  
LAMP-CASE HOOK.  
(Engages with a small eye.)



Fig. 1861.  
ECCENTRIC WINDOW-BUTTON.



Fig. 1862.  
LAMP-CASE DOOR-HOLDER.

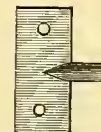


Fig. 1863.  
DECK-SASH  
PIVOT.

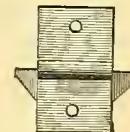


Fig. 1864.  
DECK-SASH PIVOT-  
PLATE.



Fig. 1865.  
MACHINE-BOLT.  
Square-head.



Fig. 1866.  
MACHINE-BOLT.  
Hexagon-head.



Fig. 1867.  
CARRIAGE-BOLT.



Fig. 1868.  
LAG-SCREW.



Fig. 1869.  
LUG-BOLT.



Fig. 1870.  
U-BOLT OR STRAP-BOLT.



Fig. 1871.  
KEY-BOLT.



Fig. 1872.  
EYE-BOLT.



Fig. 1873.  
WASHER, OR PLATE-WASHER.



Fig. 1874.  
BEVELED-WASHER.



Fig. 1875.  
DOUBLE-WASHER.

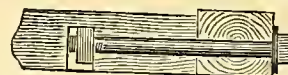


Fig. 1876.  
JOINT-BOLT.



Fig. 1877.  
TRIANGULAR-WASHER.



Fig. 1878.  
SOCKET-WASHER.



Fig. 1879.  
CAR-WASHER.



Fig. 1880.  
TORPEDO.



Fig. 1881.  
[SINGLE-SCREW TURNBUCKLE.]



Fig. 1882.  
RIGHT-AND-LEFT SCREW TURNBUCKLE.



Fig. 1883.  
SLEEVE TURNBUCKLE.

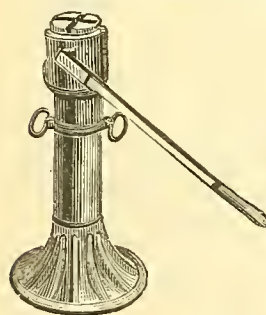


Fig. 1884.  
HYDRAULIC JACK.

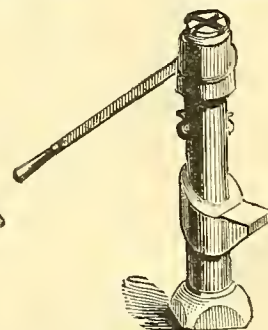


Fig. 1885.  
HYDRAULIC JACK.



Fig. 1886.  
CAR-BOX JACK-SCREW.  
(11½ in. high, with screw down: 2¼-in. screw.)

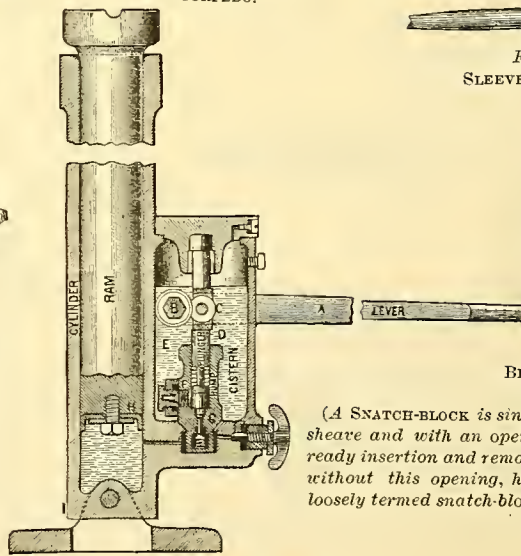


Fig. 1887. TANGYE HYDRAULIC JACK.



Fig. 1888.  
BLOCK, OR PULLEY-BLOCK  
with two SHEAVES.

(A SNATCH-BLOCK is similar, but with only one sheave and with an opening at the side for the ready insertion and removal of the rope. Blocks without this opening, however, are sometimes loosely termed snatch-blocks.)

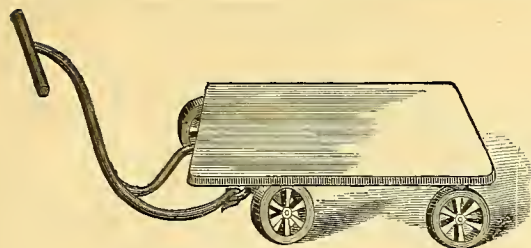


Fig. 1898. WAGON-TRUCK.

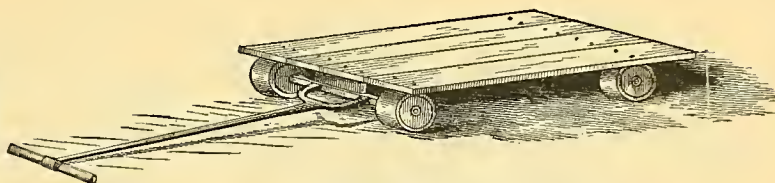


Fig. 1899. WAGON-TRUCK.

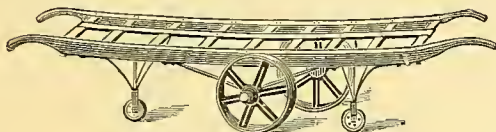


Fig. 1900. BAGGAGE-BARROW.

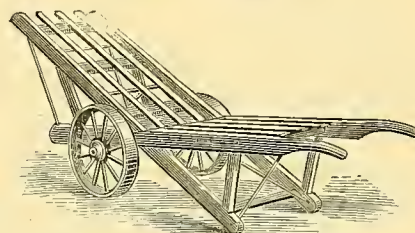


Fig. 1901. BAGGAGE-BARROW.

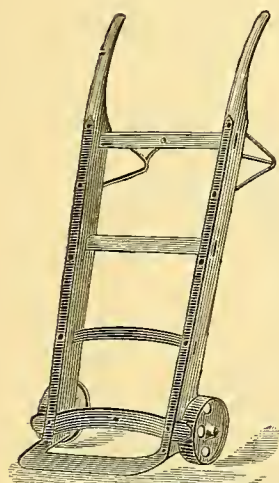


Fig. 1903. FREIGHT-TRUCK.

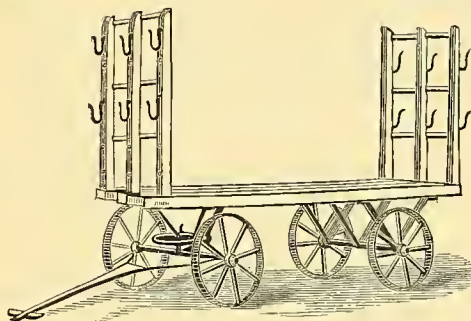


Fig. 1902. BAGGAGE WAGON-TRUCK.



Fig. 1904. SWING-BARREL TRUCK.



Fig. 1905. TELESCOPE TRUCK.

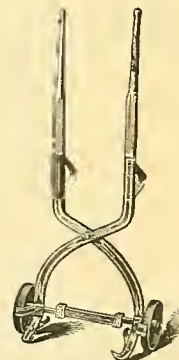


Fig. 1906.  
JOHNSON'S SELF-  
LOADING TRUCK.  
Weight, 72 lbs.  
Capacity, 1600 lbs.

(Baggage BARROWS and Freight TRUCKS are both sometimes designated as BARROW-TRUCKS.)



Numbers refer to List of Names of Parts on following page.

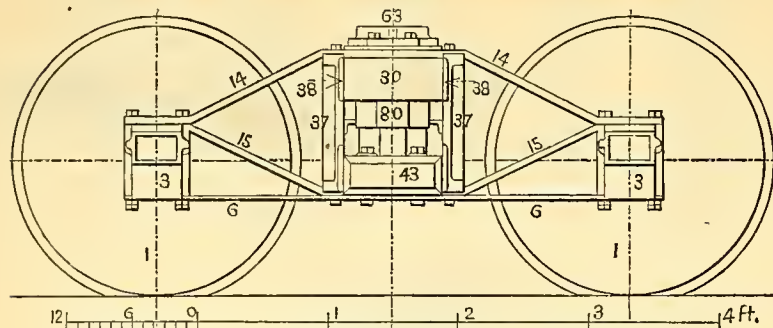


Fig. 1907. Side View.

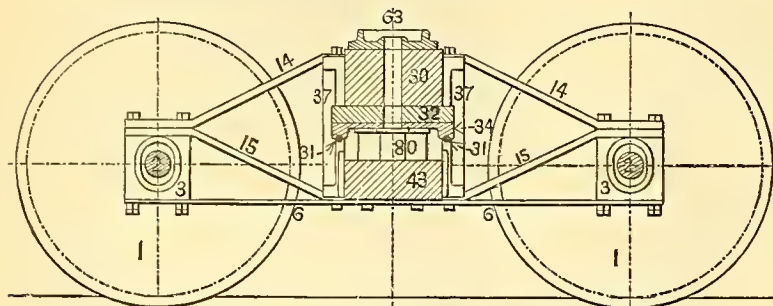


Fig. 1908. Longitudinal Section.

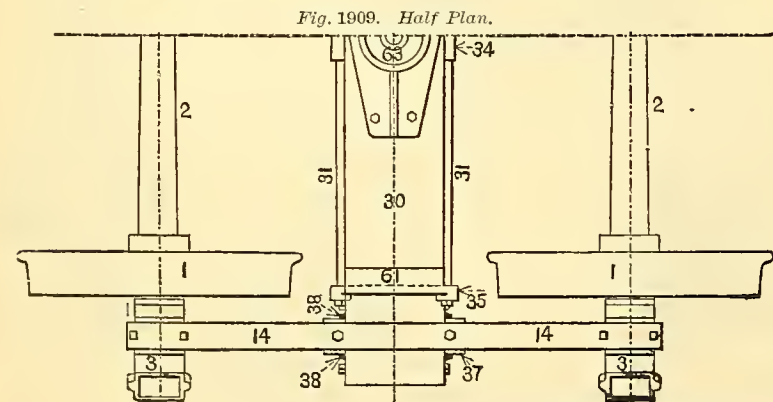


Fig. 1909. Half Plan.

DIAMOND TRUCK, CENTRAL RAILROAD OF NEW JERSEY.

CENTRAL RAILROAD OF NEW JERSEY.

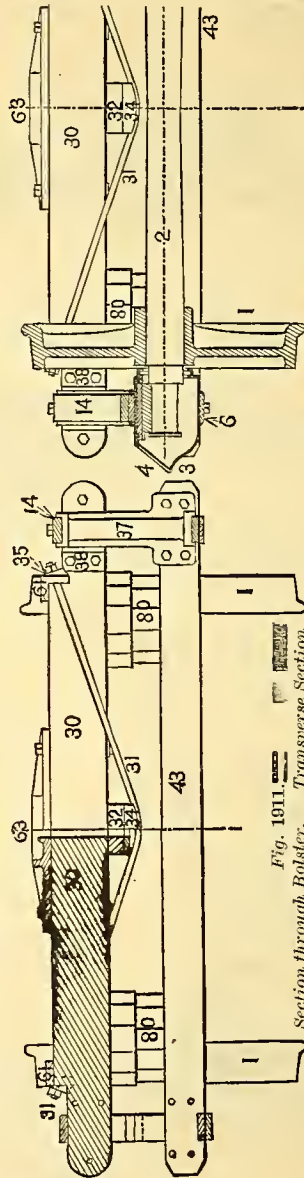


Fig. 1910.

Section through Axle.

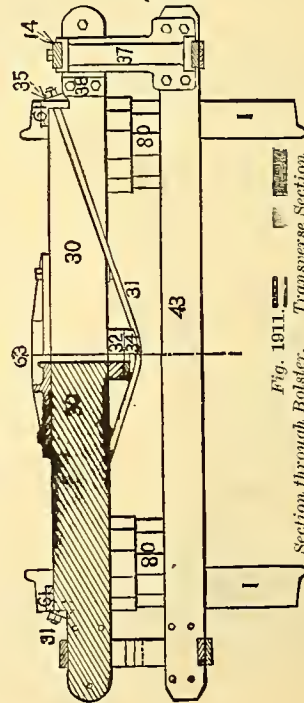


Fig. 1911. Transverse Section.

Section through Bolster.

NEW YORK CENTRAL & HUDSON RIVER RAILROAD FREIGHT-CAR TRUCK. (*Old standard. Present standard shown in Figs. 1916-1920.*)

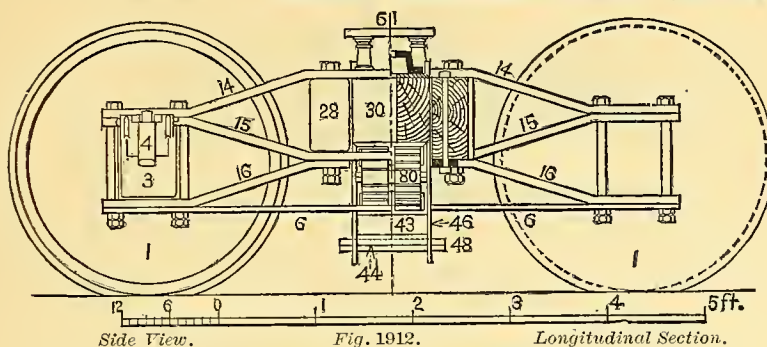


Fig. 1912.

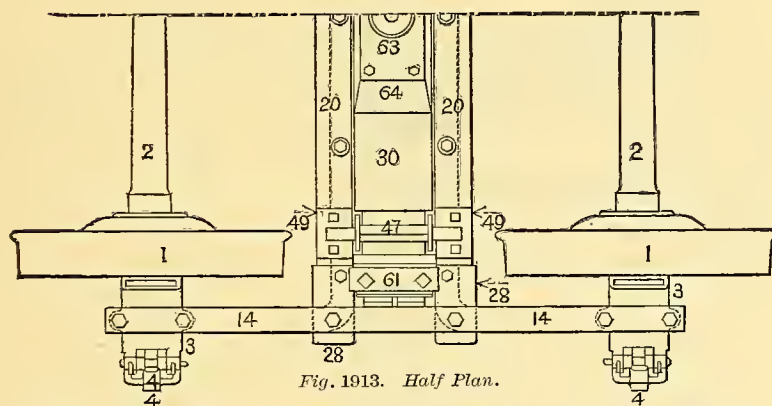
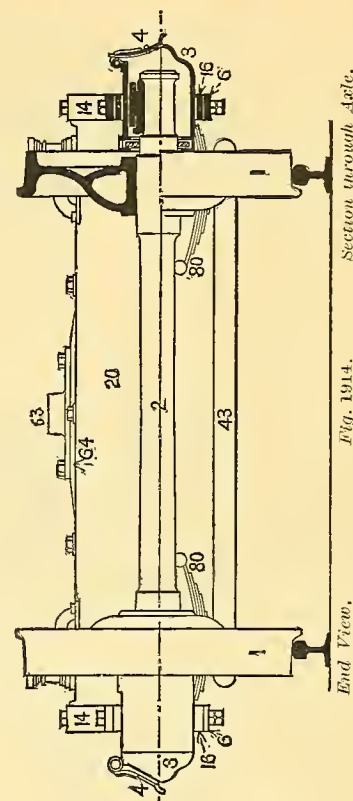


Fig. 1913. Half Plan.

DIAMOND TRUCK, NEW YORK CENTRAL AND HUDSON RIVER RAILROAD (*Old Standard*).



Section through Axle.

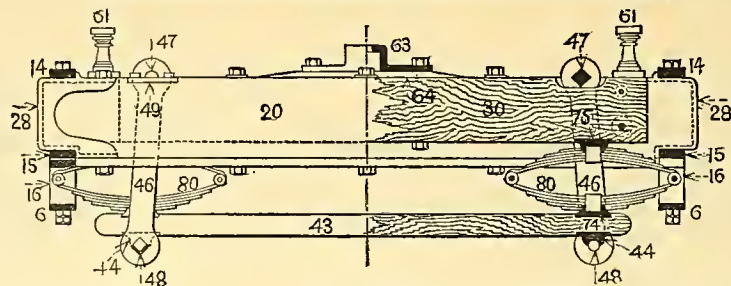
Fig. 1914.

End View.

### NAMES OF THE PARTS OF CAR-TRUCKS; Figs. 1907-1920.

- |                         |                                      |                                    |                                 |
|-------------------------|--------------------------------------|------------------------------------|---------------------------------|
| 1. Wheel.               | 20. Transom.                         | 37. Bolster Guide-bars, or Column. | 49. Swing-hanger Pivot-bearing. |
| 2. Axle.                | 27. Transom Chafing-plate.           | 38. Bolster Guide-block.           | 61. Truck Side-bearing.         |
| 3. Journal-box.         | 28. Transom-casting.                 | 43. Spring-plank.                  | 63. Truck Centre-plate.         |
| 4. Journal-box Cover.   | 30. Truck-bolster.                   | 44. Spring-plank Bearing.          | 64. Centre-plate Block.         |
| 5. Pedestal.            | 31. Truck-bolster Truss-rod.         | 46. Swing-hangers.                 | 74. Bolster Spring-seat.        |
| 6. Pedestal Tie-bar.    | 34. Truck-bolster Truss-rod Bearing. | 47. Upper Swing-hanger Pivot.      | 75. Bolster Spring-cap.         |
| 14. Arch-bar.           | 35. Truck-bolster Truss-rod Washer.  | 48. Lower Swing-hanger Pivot       | 80. Bolster-spring.             |
| 15. Inverted Arch-bar.  |                                      |                                    |                                 |
| 16. Auxiliary Arch-bar. |                                      |                                    |                                 |

Numbers refer to List of Names of Parts on preceding page.

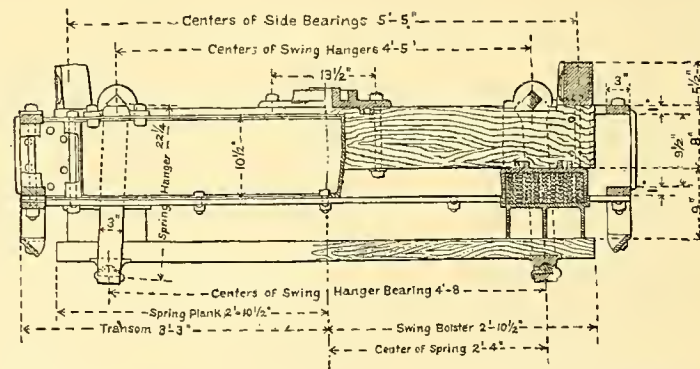


Transverse Section.

Fig. 1915.

Section through Bolster.

DIAMOND TRUCK, N. Y. CENTRAL & HUDSON RIVER RAILROAD (Old Standard).



Transverse Section.

Fig. 1916.

Section through Bolster.

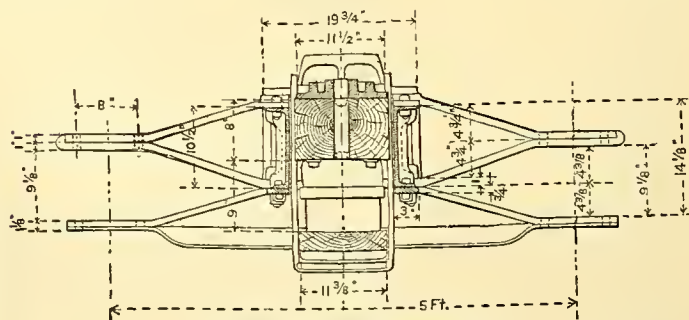


Fig. 1917. Longitudinal Section.

DIAMOND TRUCK, N. Y. CENTRAL & HUDSON RIVER RAILROAD (New Standard).



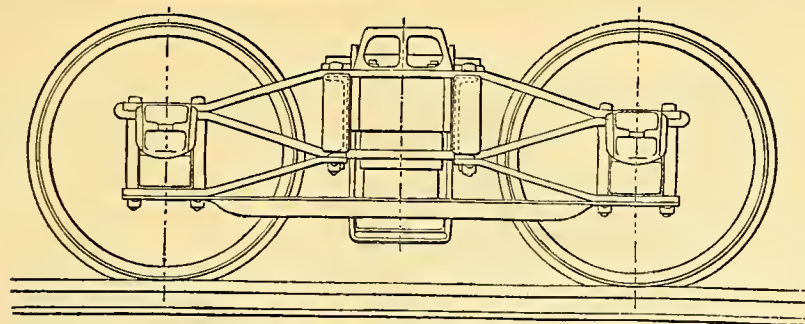


Fig. 1918,

Side Elevation.

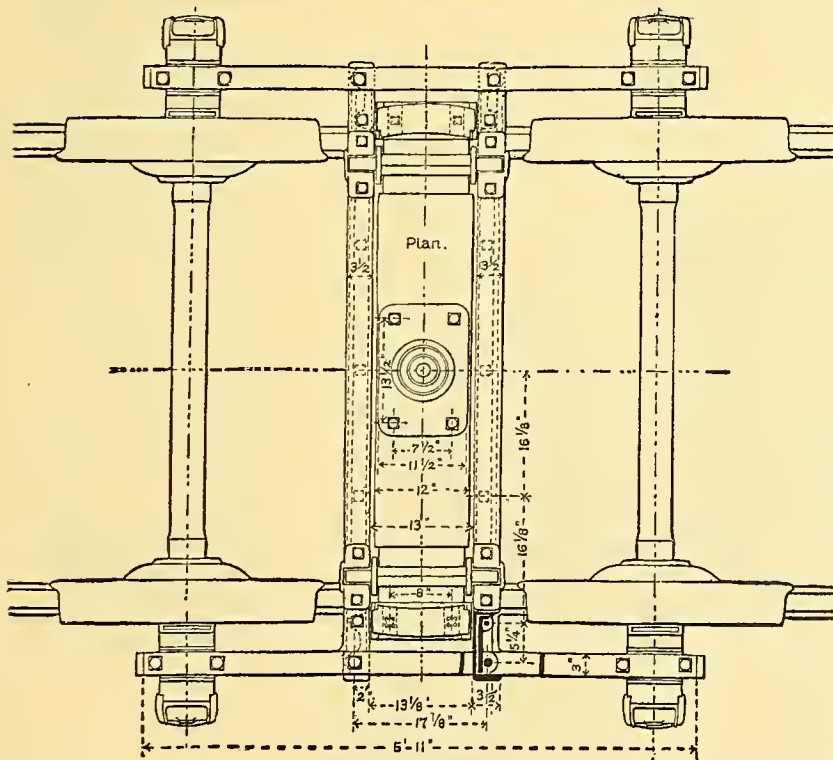
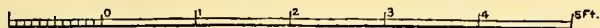


Fig. 1919, Plan.

DIAMOND TRUCK, NEW YORK CENTRAL &amp; HUDSON RIVER RAILROAD (New Standard).

NEW YORK CENTRAL & HUDSON RIVER RAILROAD  
AND CONNECTING LINES.

STANDARD FREIGHT-CAR TRUCK.

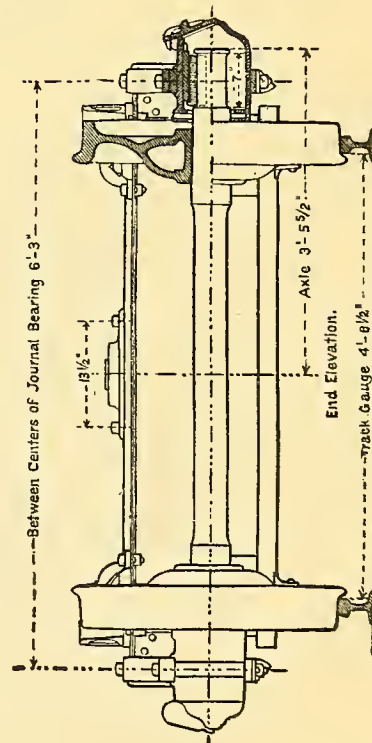
(Names of Parts are the same as in old  
standard, Figs. 1912-1915.)

Fig. 1920, End Elevation.

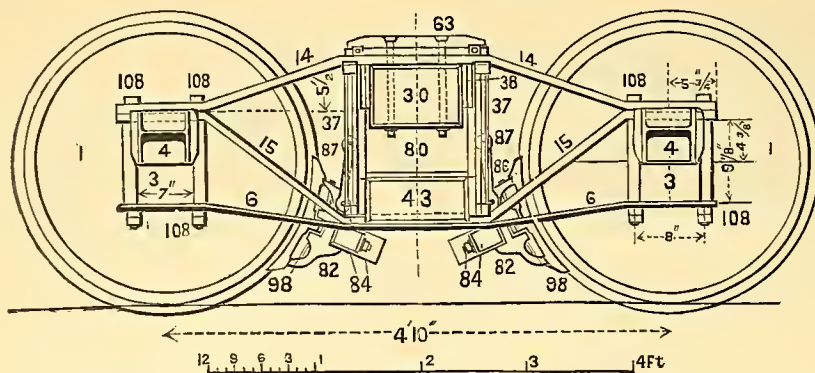


Fig. 1921. Side View.

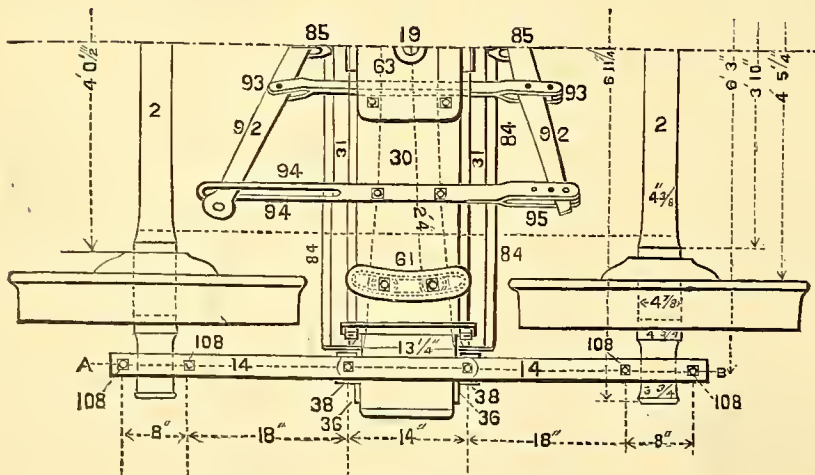


Fig. 1922. Plan.

NEW YORK, WEST SHORE & BUFFALO  
RAILWAY STANDARD FREIGHT-  
CAR TRUCK.

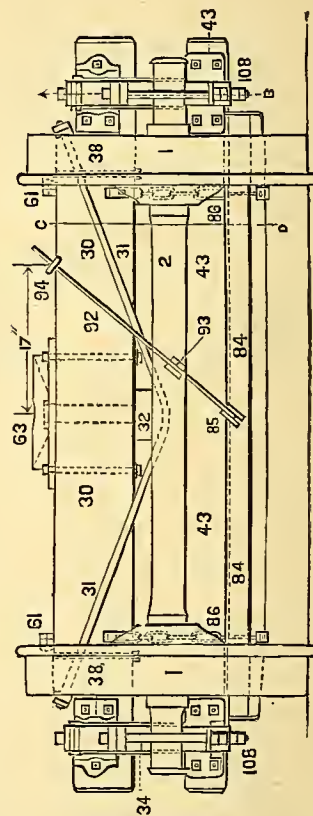


Fig. 1923. End View.

DIAMOND TRUCK, NEW YORK, WEST SHORE & BUFFALO RAILWAY.

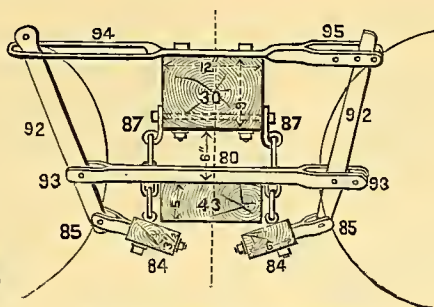


Fig. 1924. Section through Bolster.

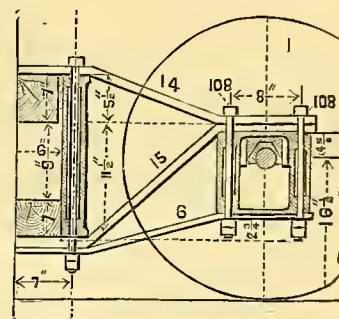
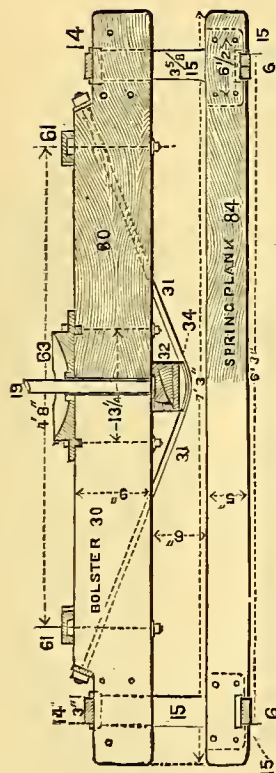


Fig. 1925. Section through Truck-frame.

NEW YORK, WEST SHORE &amp; BUFFALO RAILWAY STANDARD FREIGHT-CAR TRUCK.

## NAMES OF PARTS OF CAR TRUCKS; Figs. 1921-1936.

Fig. 1926.  
Transverse Section.

- |                                      |                                  |
|--------------------------------------|----------------------------------|
| 1. Wheel.                            | 63. Truck Centre-plate.          |
| 2. Axle.                             | 80. Bolster-spring.              |
| 3. Journal-box.                      | 82. Brake-block.                 |
| 4. Journal-box Cover.                | 84. Brake-beam.                  |
| 6. Pedestal Tie-bar.                 | 85. Brake Eye-bolt.              |
| 14. Arch-bar.                        | 86. Brake-hanger.                |
| 15. Inverted Arch-bar.               | 87. Brake-hanger Carrier.        |
| 19. King-bolt, or Centre-pin.        | 88. Brake Safety-chain.          |
| 30. Truck-bolster.                   | 89. Brake Safety-chain Eye-bolt. |
| 31. Truck-bolster Truss-rod.         | 92. Brake-lever.                 |
| 32. Truck-bolster Truss-block.       | 93. Brake-lever Fulcrum.         |
| 33. Truck-bolster King-post.         | 94. Brake-lever Guide.           |
| 34. Truck-bolster Truss-rod Bearing. | 95. Brake-lever Stop.            |
| 35. Truck-bolster Truss-rod Washer.  | 96. Brake-lever Sheave.          |
| 36. Truck-bolster Chafing-plate.     | 97. Lower Brake-rod.             |
| 37. Bolster Guide-bars.              | 98. Brake-shoe.                  |
| 38. Bolster Guide-block.             | 107. Body Centre-plate.          |
| 43. Spring-plank.                    | 108. Journal-box Bolt.           |
| 61. Truck Side-bearing.              | 109. Column Bolt.                |



Numbers refer to List of Names of Parts on preceding page.

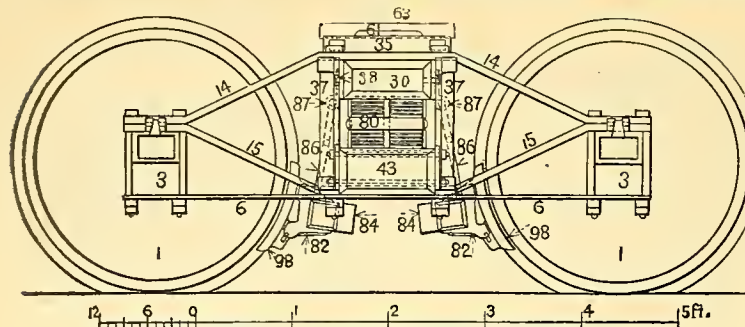


Fig. 1927. Side View.

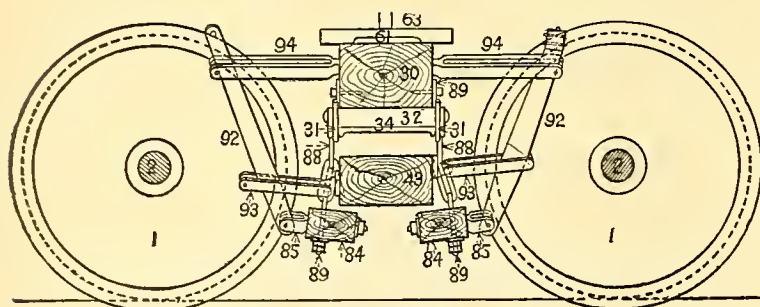


Fig. 1928. Longitudinal Section.

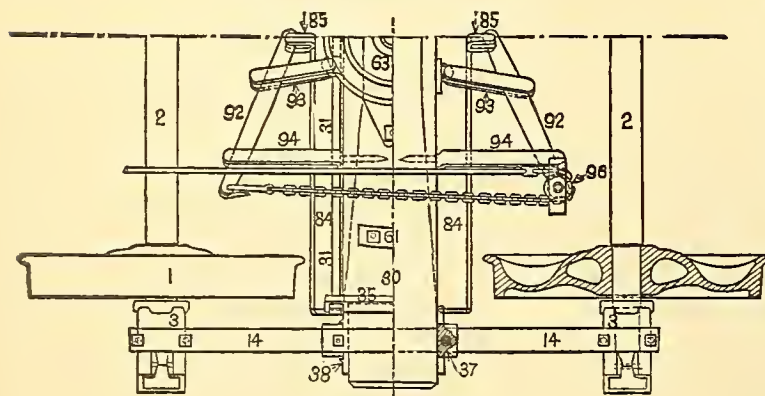


Fig. 1929. Plan.

## PENNSYLVANIA RAILROAD STANDARD FREIGHT-CAR TRUCK.

N. B.—The use of the elliptic springs shown in these engravings has been abandoned in favor of spiral springs; and the brake-hangers, 86, are now hung from a carrier attached to the spring-plank, 43. The centre-plates are of the form shown in Fig. 1930, the flat style shown in Figs. 1927-29 having been abandoned.



Fig. 1930. New form of Centre-plates.

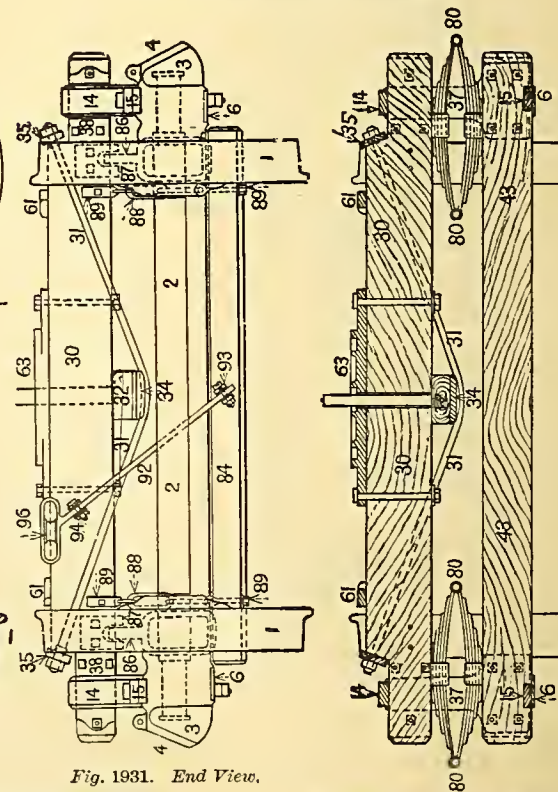


Fig. 1931. End View.

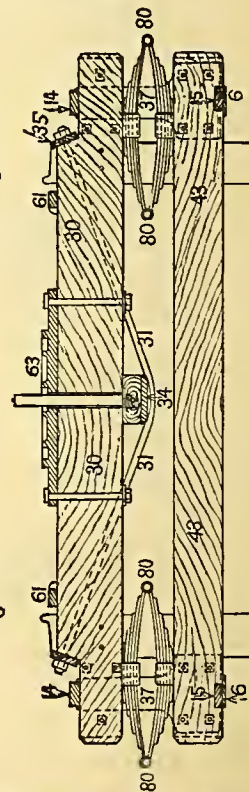


Fig. 1932. Transverse Section.

DIAMOND TRUCK, PENNSYLVANIA RAILROAD.

Numbers refer to List of Names of Parts on second page ahead or back.

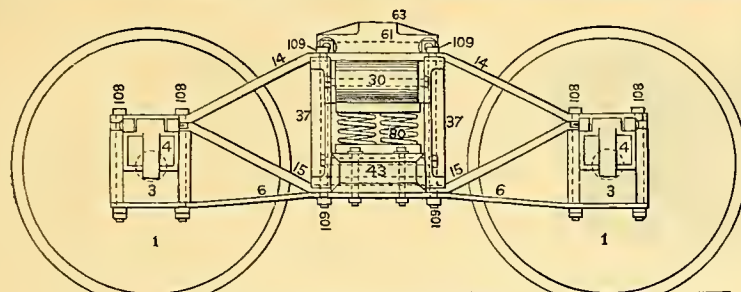


Fig. 1933. Side View.

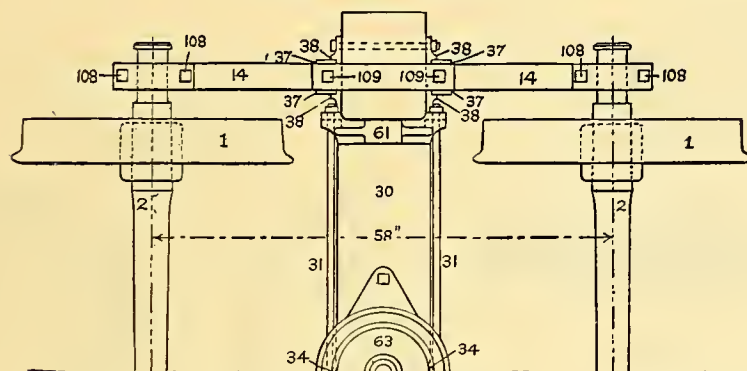


Fig. 1934. Plan.

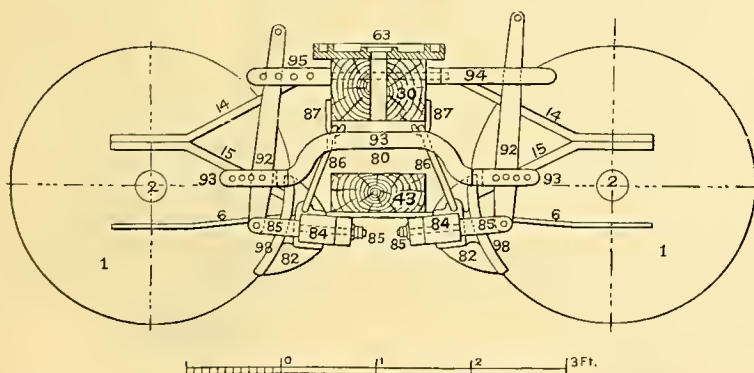


Fig. 1935. Longitudinal Section.

DIAMOND TRUCK, PHILADELPHIA & READING RAILROAD.

PHILADELPHIA & READING RAIL-  
ROAD STANDARD FREIGHT-  
CAR TRUCK.

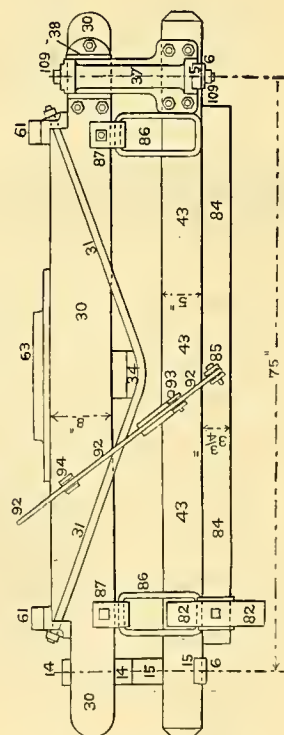


Fig. 1936. End View.

Numbers refer to List of Names of Parts on following page.

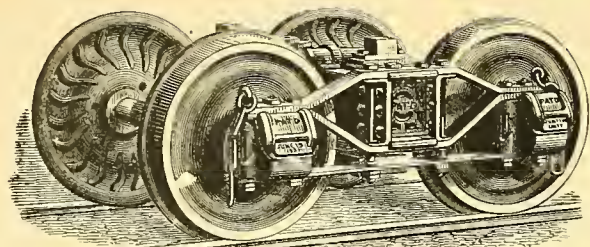


Fig. 1937. Perspective View.

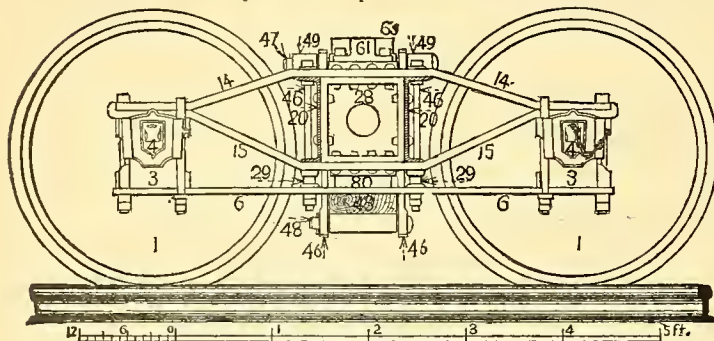


Fig. 1938. Side View.

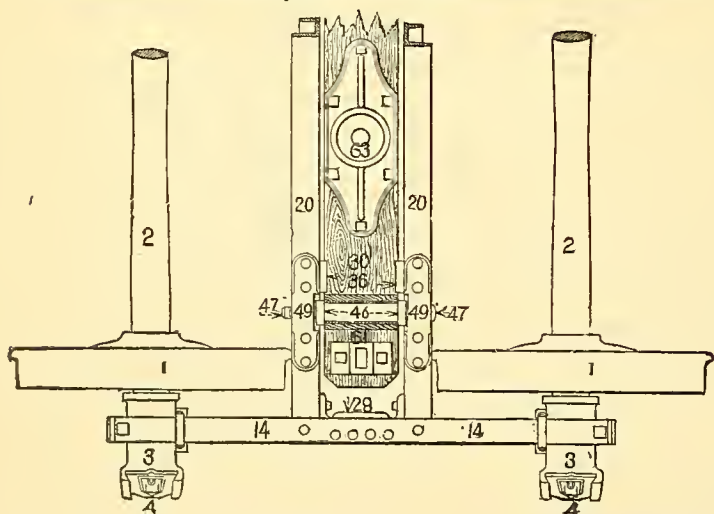


Fig. 1939. Plan.

THIELSEN TRUCK.

THIELSEN TRUCK.

STANDARD OF SEVERAL LINES.

(Several modified types of this general design exist which are not shown by drawings.)

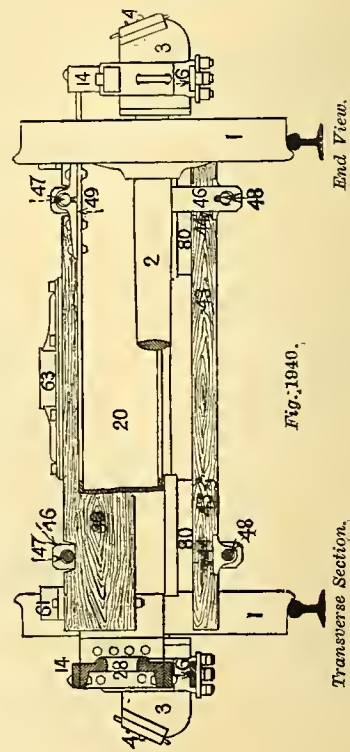


Fig. 1940.



## CAR TRUCKS.

### COMPLETE LIST OF NAMES OF THE PARTS OF FREIGHT-CAR TRUCKS, *Figs. 1907-1953.*

*Names of parts in Roman type are special to the miscellaneous and exceptional types of freight-car trucks shown on the four following pages. Those in italics only are parts belonging to the Diamond type of truck, which is now the almost universal standard.*

*Numbers which are omitted from this list are for parts special to passenger car trucks, Figs. 1954-1973.*

- |                                |                              |                            |                           |
|--------------------------------|------------------------------|----------------------------|---------------------------|
| 1. <i>Wheel.</i>               | 27. Transom Chafing-plate.   | 47. Upper Swing-hanger     | 84. Brake-beam.           |
| 2. <i>Axle.</i>                | 28. Transom-casting.         | Pivot.                     | 85. Brake Eye-bolt.       |
| 3. <i>Journal-box.</i>         | 29. Transom pillar.          | 48. Lower Swing-hanger     | 86. Brake-hanger.         |
| 4. <i>Journal-box Cover.</i>   | 30. Truck-bolster.           | Pivot.                     | 87. Brake-hanger Carrier. |
| 5. <i>Pedestal.</i>            | 31. Truck-bolster Truss-rod. | 49. Swing-hanger Pivot-    | 88. Brake Safety-chain.   |
| 6. <i>Pedestal Tie-bar.</i>    | 32. Truck-bolster Truss-     | bearing.                   | 89. Brake Safety-chain    |
| 9. Continuous Truck-           | block.                       | 51. Safety-beam.           | Eye-bolt.                 |
| frame.                         | 34. Truck-bolster Truss-     | 55. Axle Safety-strap.     | 90. Brake Safety-strap.   |
| 10. Wheel-piece.               | rod Bearing.                 | 57. Safety-beam Truss-rod. | 91. Release-spring.       |
| 14. <i>Arch-bar.</i>           | 35. Truck-bolster Truss-     | 58. Safety-beam Truss-rod  | 92. Brake-lever.          |
| 15. <i>Inverted Arch-bar.</i>  | rod-Washer.                  | bearing.                   | 93. Brake-lever Fulcrum.  |
| 16. <i>Auxiliary Arch-bar.</i> | 36. Truck-bolster Chafing-   | 61. Truck Side-bearing.    | 94. Brake-lever Guide.    |
| 17. End-piece, of Truck        | plate.                       | 63. Truck Centre-plate.    | 95. Brake-lever Stop.     |
| frame.                         | 37. Bolster Guide-bars.      | 64. Centre-plate Block.    | 96. Brake-lever Sheave.   |
| 18. Truck-frame King-post.     | 38. Bolster Guide-block.     | 74. Bolster Spring-seat.   | 97. Lower Brake-rod.      |
| 20. <i>Transom.</i>            | 39. Truck-frame Queen-       | 75. Bolster Spring-cap.    | 98. Brake-shoe.           |
| 24. Transom Truss-rod.         | posts.                       | 78. Journal-spring.        | 107. Body Centre-plate.   |
| 25. Transom Truss-block.       | 43. Spring-plank.            | 80. Bolster-spring.        | 108. Journal-box Bolts.   |
| 26. Transom Truss-rod          | 44. Spring-plank Bearing.    | 82. Brake-block.           | 109. Column-bolt.         |
| Washer.                        | 46. Swing-hangers.           | 83. Brake-head.            |                           |

Numbers refer to List of Names of Parts on preceding page.

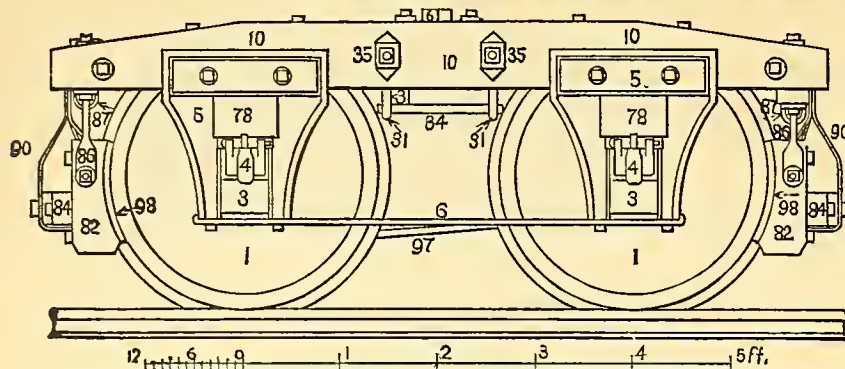


Fig. 1942.

NEW YORK & HARLEM RAILROAD.  
WOODEN FREIGHT-CAR TRUCK.  
(Old style; no longer built.)

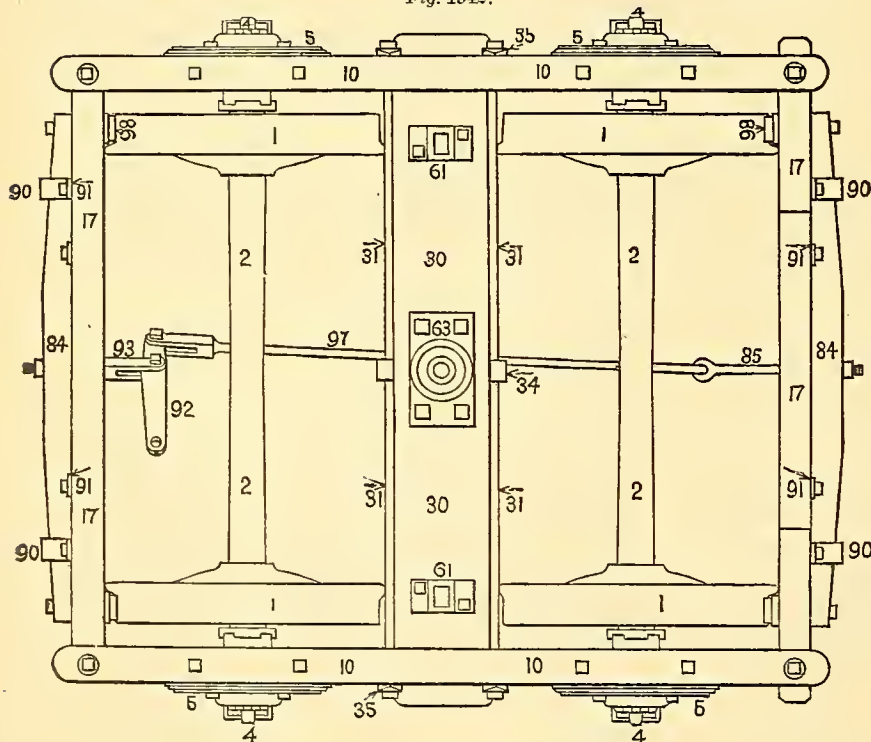


Fig. 1943. Plan.

CAR TRUCK, NEW YORK & HARLEM RAILROAD.

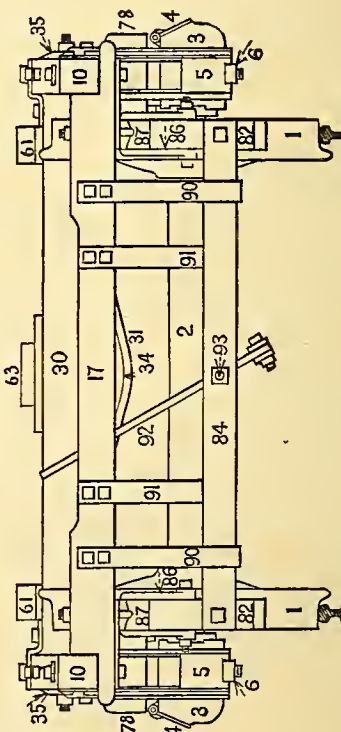
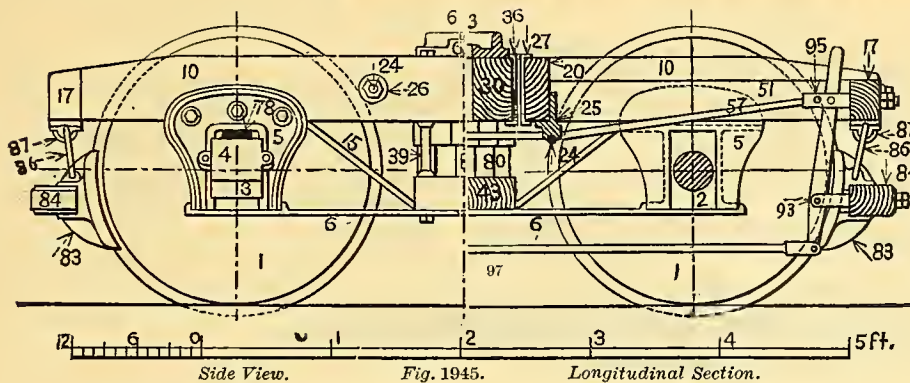


Fig. 1944. End View.

Numbers refer to List of Names of Parts on second page back.



CENTRAL RAILROAD OF NEW JERSEY.  
WOODEN FREIGHT-CAR TRUCK.  
(Old style; no longer built.)

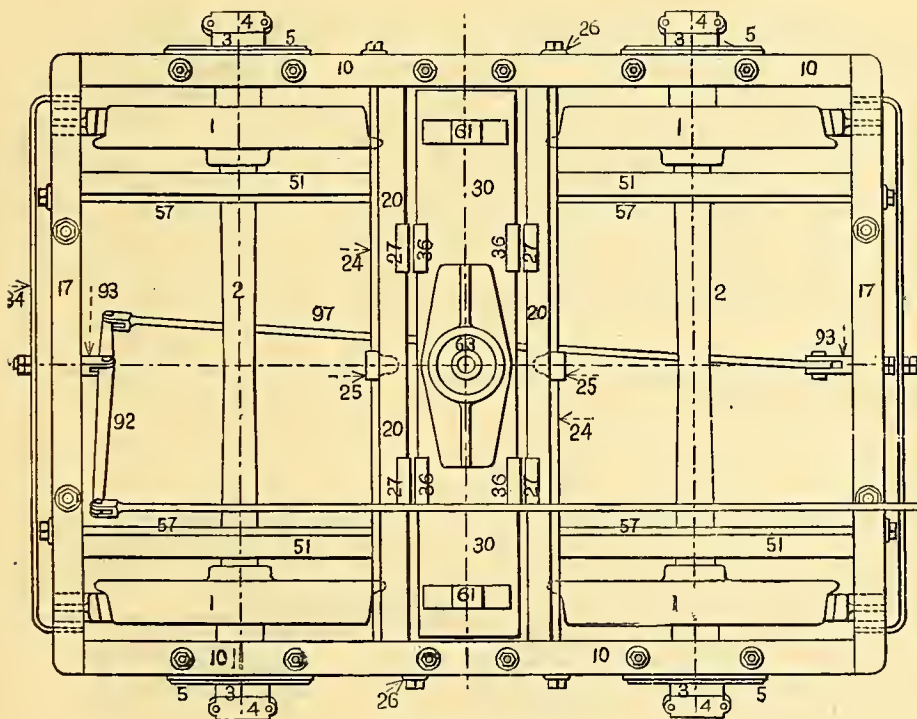


Fig. 1946. Plan.

WOODEN FREIGHT-CAR TRUCK, CENTRAL RAILROAD OF NEW JERSEY.

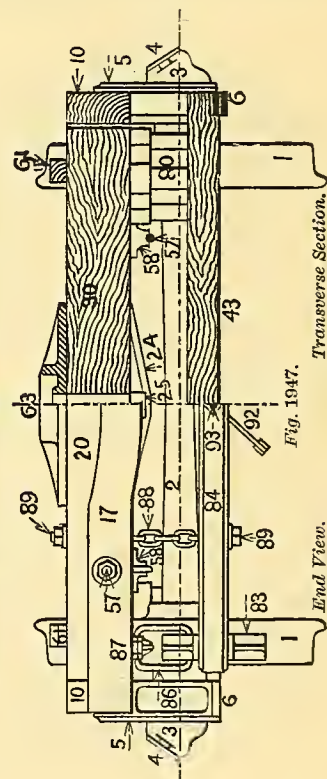
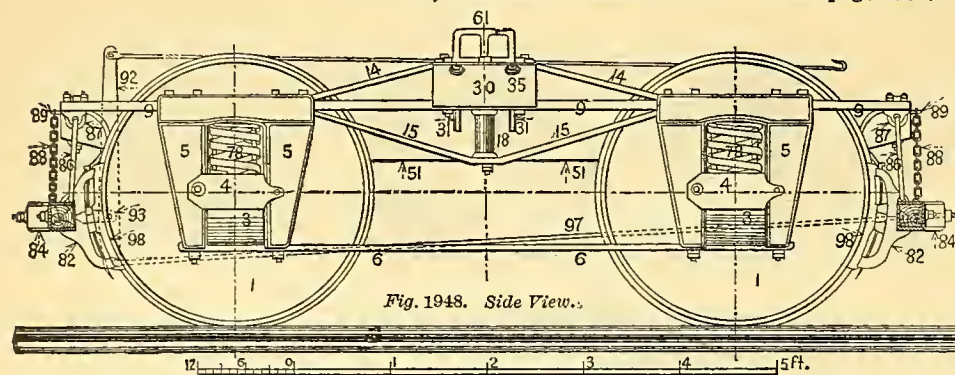


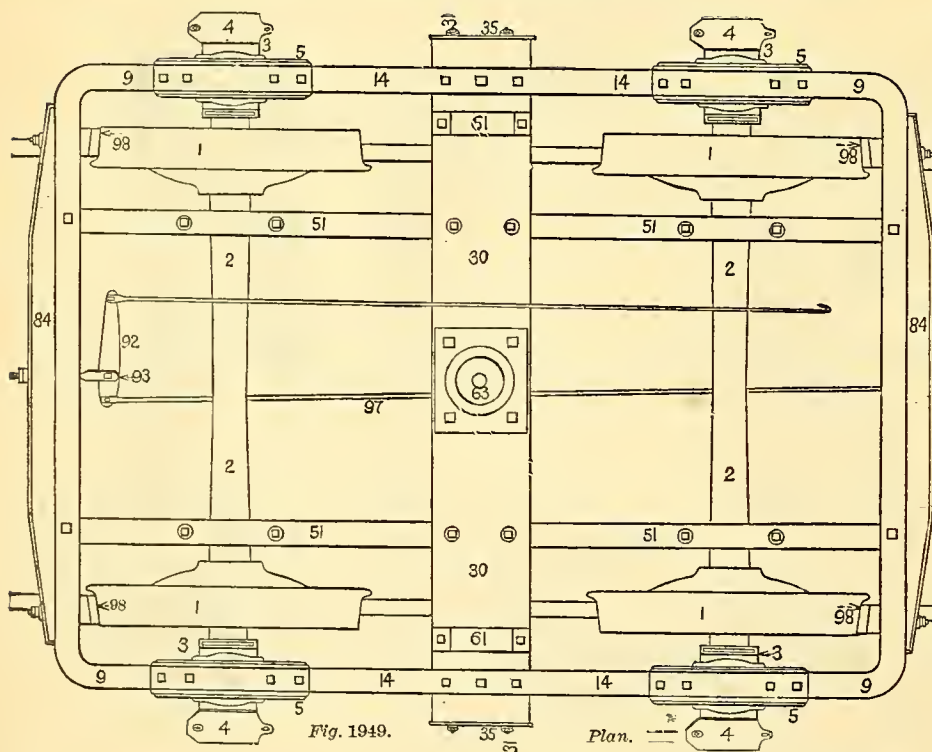
Fig. 1947.



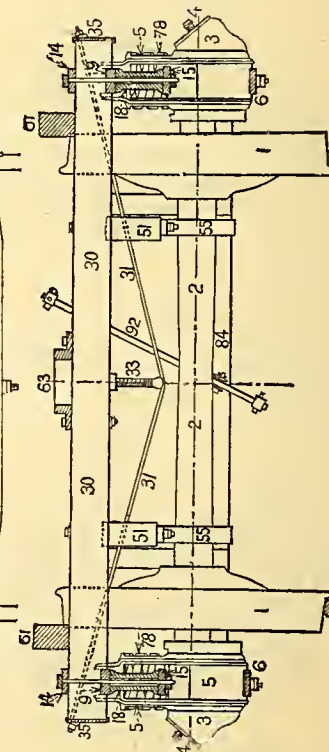
Numbers refer to List of Names of Parts on third page back.

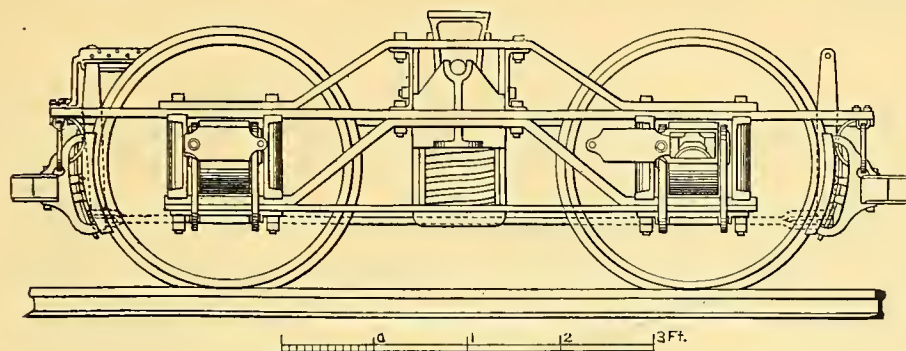
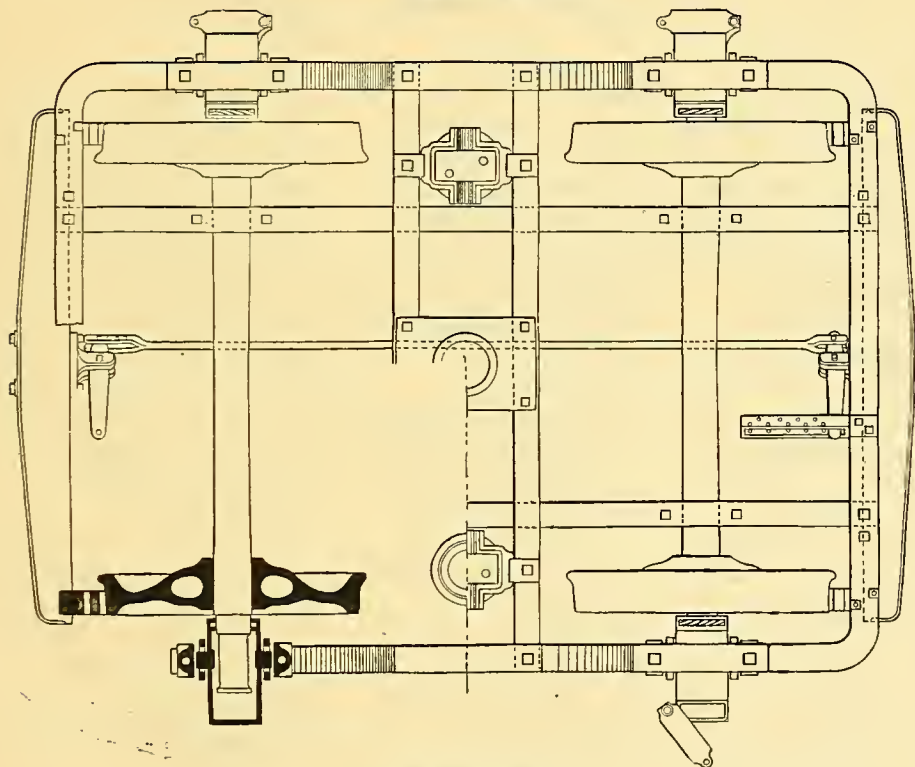


BOSTON & ALBANY RAILROAD.  
CONTINUOUS-FRAME TRUCK;  
STANDARD FOR FREIGHT SERVICE.



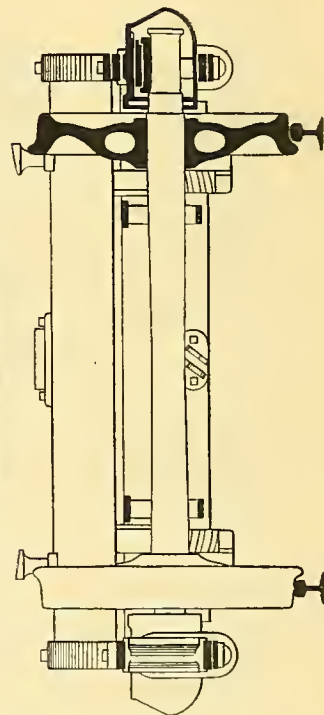
CONTINUOUS-FRAME TRUCK, BOSTON & ALBANY RAILROAD.



Fig. 1951, *Side View.*Fig. 1952. *Plan.*  
CONTINUOUS-FRAME TRUCK, BOSTON & ALBANY RAILROAD.

BOSTON & ALBANY RAILROAD.  
CONTINUOUS-FRAME TRUCK; MODIFIED  
TYPE.

(Not a standard type. Names of  
parts are substantially the same as  
similar parts in truck on preceding  
page and elsewhere.)

Fig. 1953. *End View and Section.*

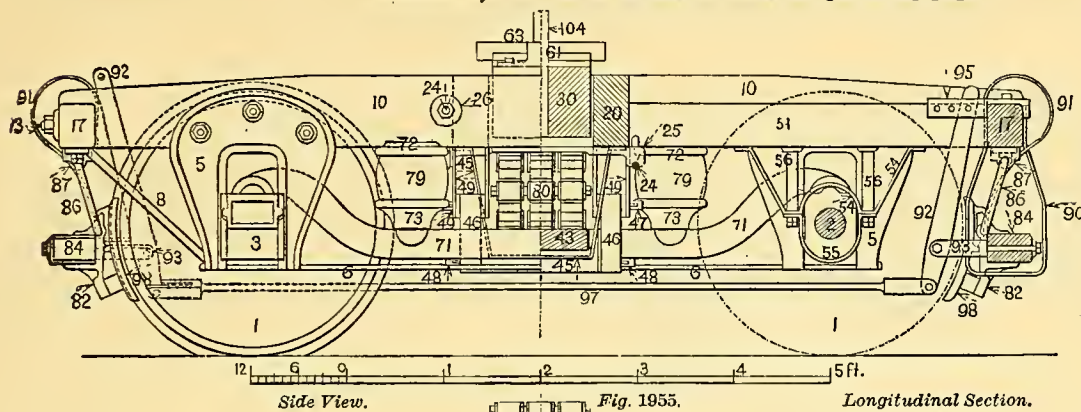
COMPLETE LIST OF NAMES OF PARTS OF PASSENGER-CAR TRUCKS; Figs. 1955-1973.

(Names of parts in Roman type are special to SIX-WHEEL car-trucks. Numbers which are omitted from this list are for parts special to freight-car trucks, shown on the pages immediately preceding.)

- |                             |                            |                               |                            |
|-----------------------------|----------------------------|-------------------------------|----------------------------|
| 1. Wheel.                   | 26. Transom Truss-rod      | 54. Axle Safety-bearing.      | 80. Bolster-spring.        |
| 2. Axle.                    | Washer.                    | 55. Axle Safety-strap.        | 81. Truck-frame Knee-iron. |
| 3. Journal-box.             | 27. Transom Chafing-plate. | 56. Axle Safety-bearing       | 82. Brake-block.           |
| 4. Journal-box Cover.       | 28. Transom-casting.       | Thimbles.                     | 83. Brake-head.            |
| 5. Pedestal.                | 29. Transom-pillar.        | 59. Safety-beam Tie-rod.      | 84. Brake-beam.            |
| 6. Pedestal Tie-bar.        | 30. Truck-bolster.         | 60. Safety-beam Iron.         | 85. Brake Eye-bolt.        |
| 7. Pedestal Stay-rod.       | 36. Truck-bolster Chafing- | 61. Truck Side-bearing.       | 86. Brake-hanger.          |
| 8. Pedestal-brace.          | plate.                     | 62. Side-bearing Bridge.      | 87. Brake-hanger Carrier.  |
| 8'. Pedestal-brace Tie-bar. | 40. Lateral-motion Spring. | 63. Truck Centre-plate.       | 88. Brake Safety-chain.    |
| 10. Wheel-piece.            | 41. Lateral-motion Spring- | 64. Centre-plate Block.       | 89. Brake Safety-chain     |
| 11. Outside Wheel-piece     | pin.                       | 65. Centre-bearing Beam.      | Eye-bolt.                  |
| Plate.                      | 42. Spring-beam.           | 66. Centre-bearing Arch-bar.  | 90. Brake Safety-strap.    |
| 12. Inside Wheel-piece      | 43. Spring-plank.          | 67. Centre-bearing Inverted   | 91. Release-spring.        |
| Plate.                      | 44. Spring-plank Bearing.  | Arch-bar.                     | 92. Brake-lever.           |
| 13. Wheel-piece Truss-rod.  | 45. Spring-plank Safety    | 68. Check-chain.              | 93. Brake-lever Fulcrum.   |
| 14. Arch-bar.               | Strap.                     | 69. Truck Check-chain Hook.   | 94. Brake-lever Guide.     |
| 15. Inverted Arch-bar.      | 46. Swing-hangers.         | 70. Truck Check-chain Eye.    | 95. Brake-lever Stop.      |
| 16. Auxiliary Arch-bar.     | 47. Upper Swing-hanger     | 71. Equalizing-bar.           | 96. Brake-lever Sheave.    |
| 17. End-piece, of Truck-    | Pivot.                     | 72. Equalizing-bar Spring-    | 97. Lower Brake-rod.       |
| frame.                      | 48. Lower Swing-hanger     | cap.                          | 98. Brake-shoe.            |
| 20. Transom.                | Pivot.                     | 73. Equalizing-bar Spring-    | 99. Journal-box Guides.    |
| 21. Middle Transom, for     | 49. Swing-hanger Pivot-    | seat.                         | 100. Pedestal-horns.       |
| Six-wheeled Truck.          | bearing.                   | 74. Bolster Spring-seat.      | 101. Pedestal-jaw.         |
| 22. Outside Transom, for    | 50. Swing-hanger Friction- | 75. Bolster Spring-cap.       | 102. Spring-hanger.        |
| Six-wheeled Truck.          | block.                     | 76. Spring-block.             | 103. Spring-saddle.        |
| 23. Transom Tie-bar.        | 51. Safety-beam.           | 77. Jaw-bit (Fig. 2025 only). | 104. King-bolt, or Centre- |
| 24. Transom Truss-rod.      | 52. Middle Safety-beam.    | 78. Journal-spring.           | pin.                       |
| 25. Transom Truss-block.    | 53. Safety-beam Block.     | 79. Equalizing-bar Spring.    |                            |

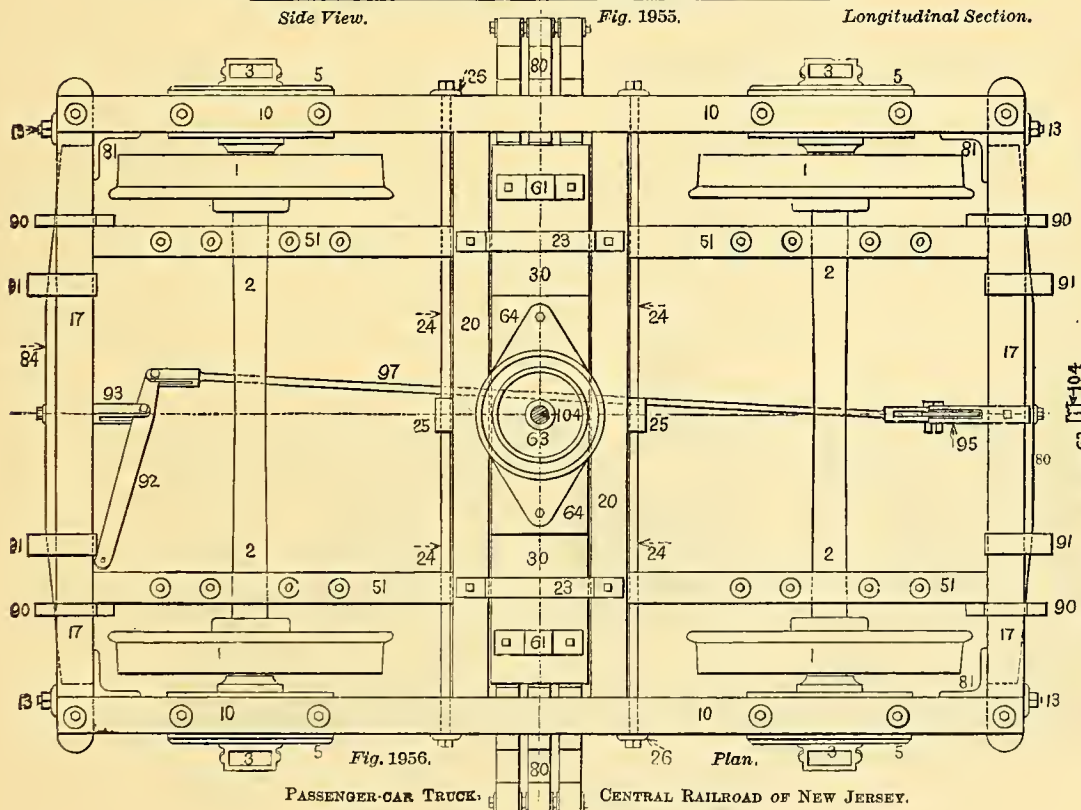


Numbers refer to List of Names of Parts on preceding page.



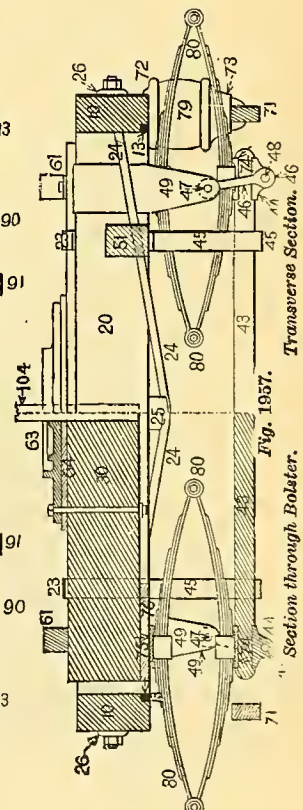
CENTRAL RAILROAD OF NEW JERSEY.

STANDARD PASSENGER-CAR TRUCK.



PASSENGER-CAR TRUCK,

CENTRAL RAILROAD OF NEW JERSEY.



Numbers refer to **List of Names of Parts** on second page back.

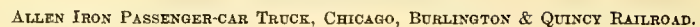


PASSENGER-CAR TRUCK, CENTRAL RAILROAD OF NEW JERSEY.

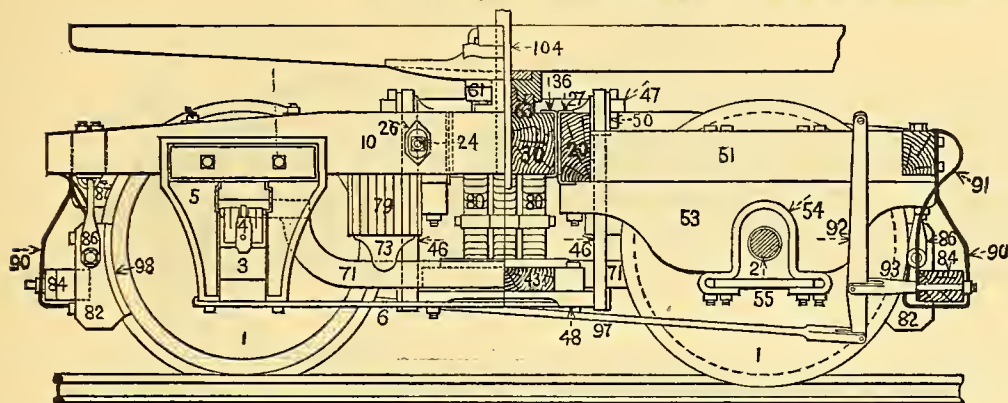
CHICAGO, BURLINGTON &amp; QUINCY RAILROAD.

ALLEN IRON PASSENGER-CAR TRUCK.

(Old style ; no longer built.)



Numbers refer to List of Names of Parts on third page back.



Side View. Fig. 1960. Longitudinal Section.

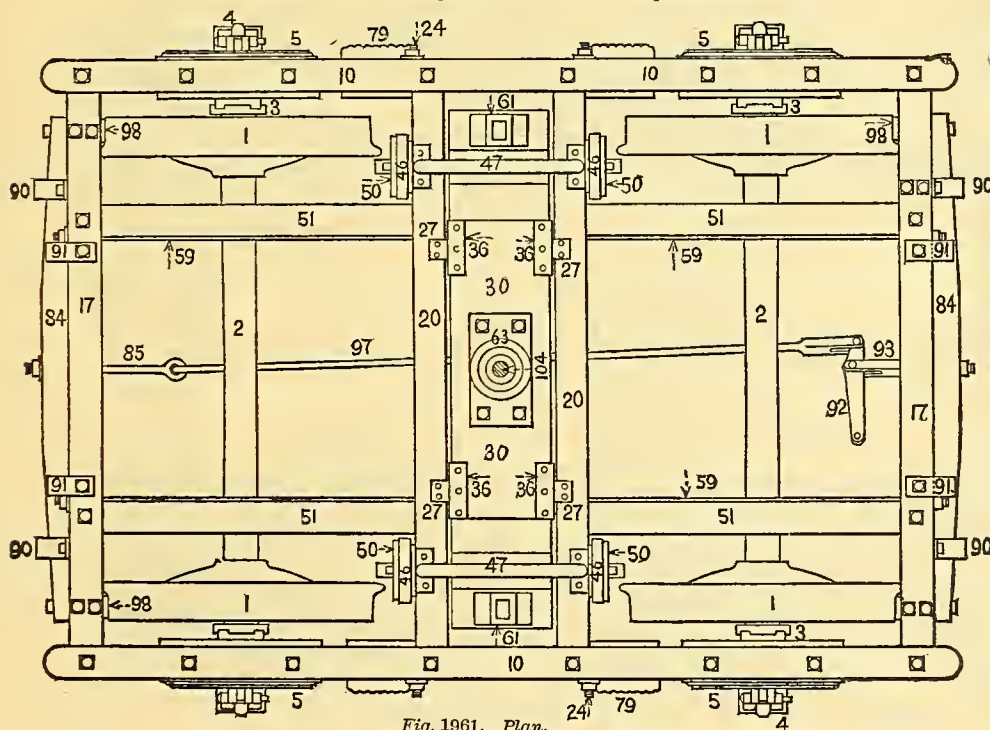


Fig. 1961. Plan.

PASSENGER-CAR TRUCK, NEW YORK & HARLEM RAILROAD.

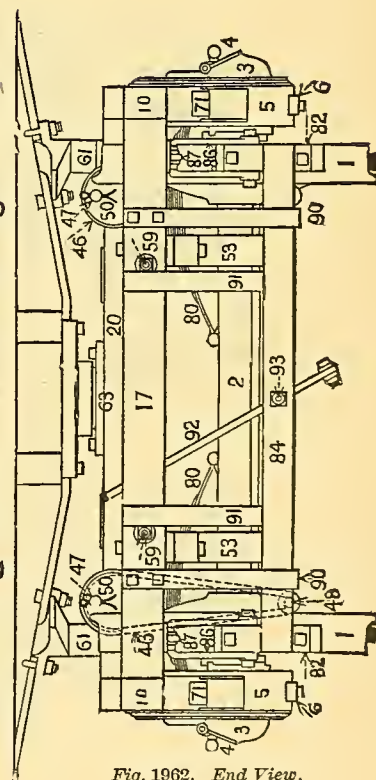
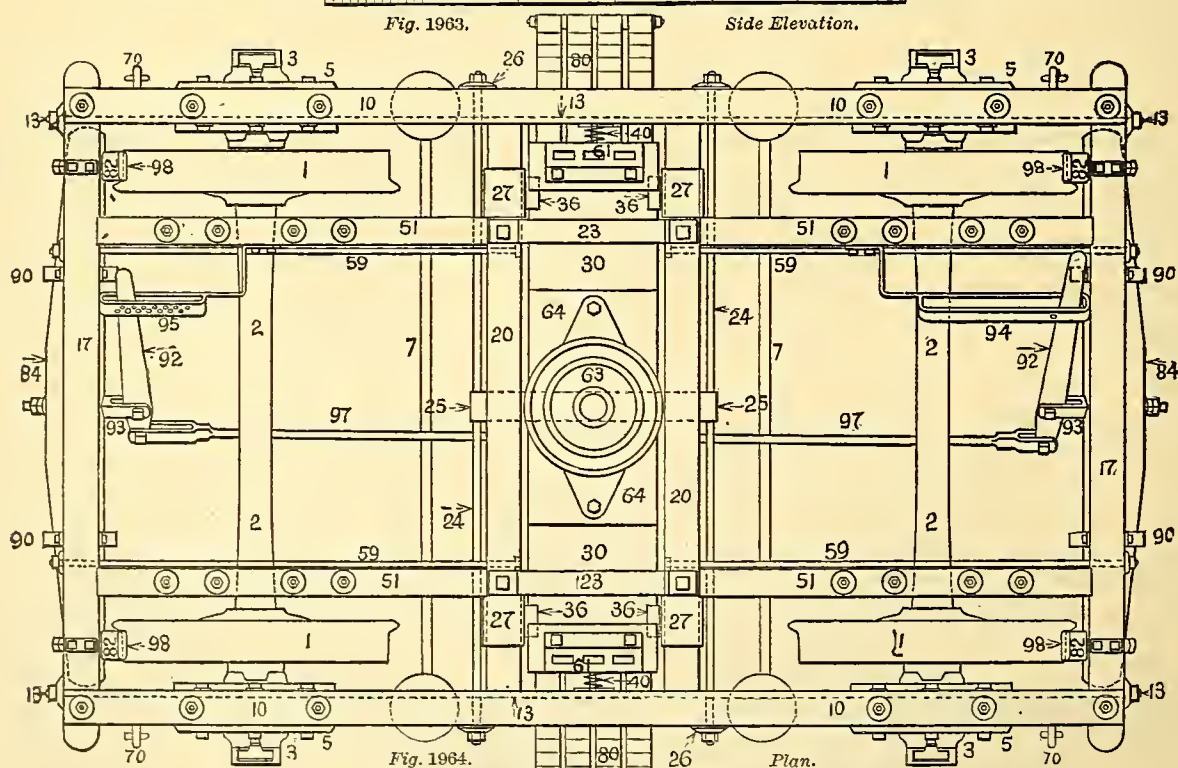
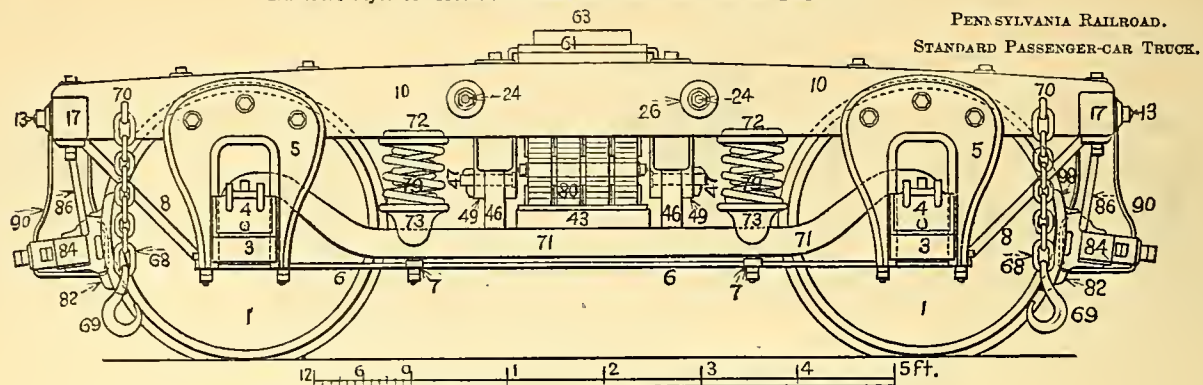


Fig. 1962. End View.



Numbers refer to List of Names of Parts on fourth page back.



PASSENGER-CAR TRUCK. PENNSYLVANIA RAILROAD.

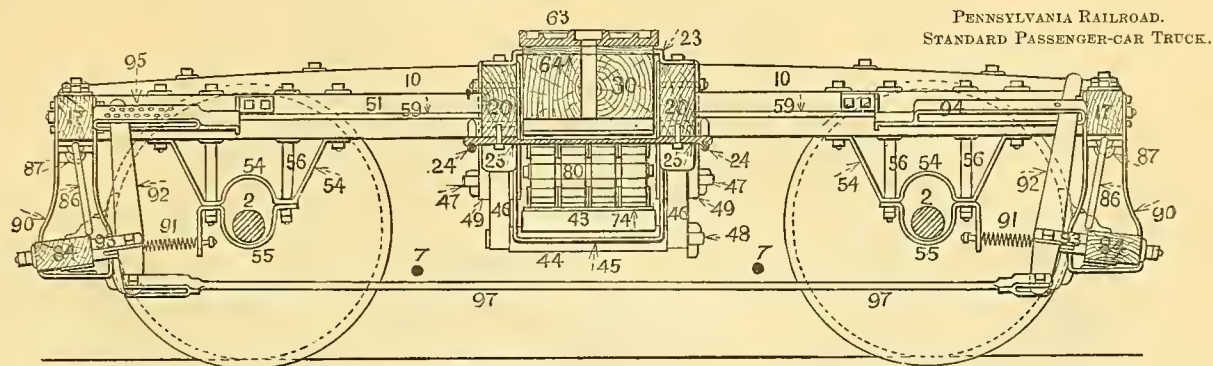


Fig. 1965. Longitudinal Section.

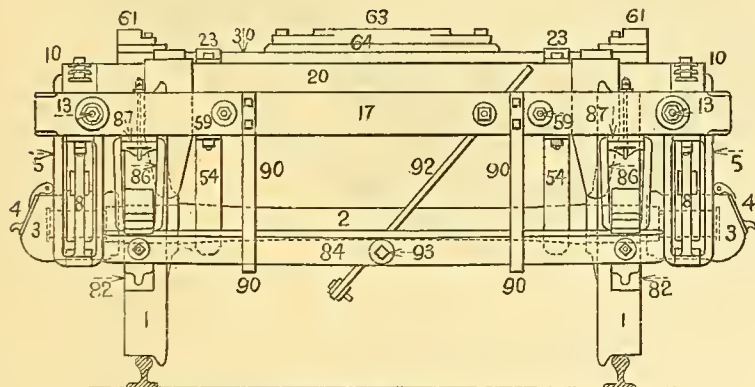
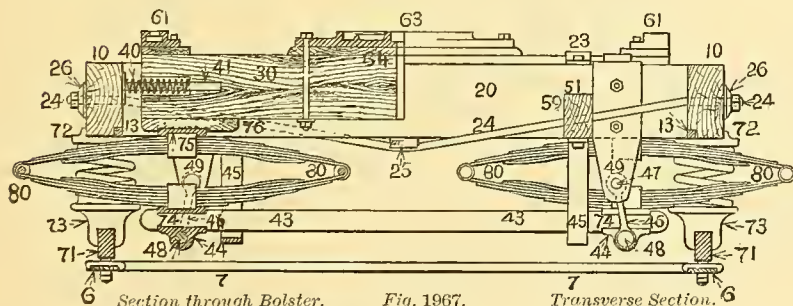


Fig. 1966. End View.



Section through Bolster. Fig. 1967.

Transverse Section.

PASSENGER-CAR TRUCK, PENNSYLVANIA RAILROAD.

(The centre-plate shown in these engravings, Figs. 1963 to 1967, is no longer used, the "Pullman" centre-plate, Figs. 2107-09, being used instead.)

(The LOWER BRAKE-ROD, 97, passes under the PEDESTAL STAY-ROD, 7, at the bottom of Fig. 1967 and is supported by a LOWER BRAKE-ROD CARRIER, but neither the rod nor the carrier are shown.)

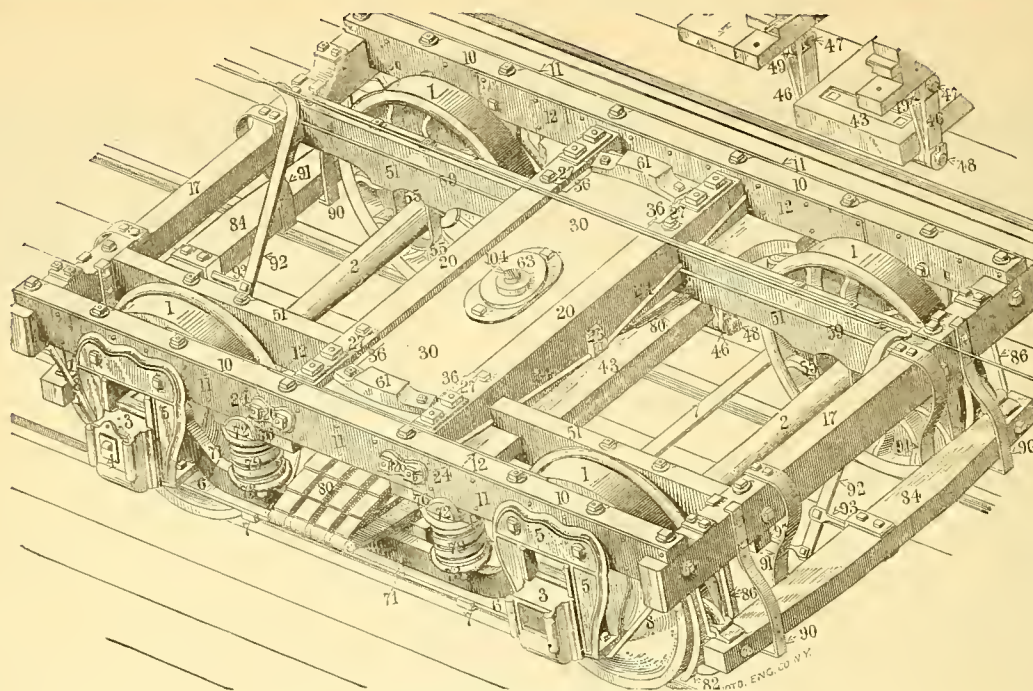


Fig. 1968. Perspective View.  
PASSENGER-CAR TRUCK, PULLMAN PALACE CAR COMPANY.

# NAMES OF PARTS OF PASSENGER-CAR TRUCKS ; Figs. 1968-1970.

(Names of parts in Roman type are special to SIX-WHEEL car-trucks.)

- |                                |   |                                       |                                       |
|--------------------------------|---|---------------------------------------|---------------------------------------|
| 1. Wheel.                      | 17. End-piece, of Truck-frame.              | 42. Spring-beam.                      | 52. Middle Safety-beam.               |
| 2. Axle.                       | 20. Transom.                                | 43. Spring-plank.                     | 55. Axle Safety-strap.                |
| 3. Journal-box.                | 21. Middle Transom, for Six-wheeled Truck.  | 44. Spring-plank Bearing (not shown). | 59. Safety-beam Tie-rod.              |
| 4. Journal-box Cover.          | 22. Outside Transom, for Six-wheeled Truck. | 46. Swing-hangers.                    | 60. Safety-beam Iron.                 |
| 5. Pedestal.                   | 24. Transom Truss-rod.                      | 47. Upper Swing-hanger Pivot.         | 61. Truck Side-bearing.               |
| 6. Pedestal Tie-bar.           | 26. Transom-truss-rod Washer.               | 48. Lower Swing-hanger Pivot.         | 62. Side-bearing Bridge.              |
| 7. Pedestal Stay-rod.          | 27. Transom Chafing-plate.                  | 49. Swing-hanger Pivot-bearing.       | 63. Truck Centre-plate.               |
| 8. Pedestal-brace.             | 30. Truck-bolster.                          | 50. Swing-hanger Friction-block.      | 65. Centre-bearing Beam.              |
| 8'. Pedestal Brace-tie-bar.    | 36. Truck-bolster Chafing-plate.            | 51. Safety-beam.                      | 66. Centre-bearing Arch-bar.          |
| 10. Wheel-piece.               |   |                                       | 67. Centre-bearing Inverted Arch-bar. |
| 11. Outside Wheel-piece Plate. |   |                                       | 70. Truck Check-chain Eye.            |
| 12. Inside Wheel-piece Plate.  |   |                                       | 71. Equalizing-bar.                   |



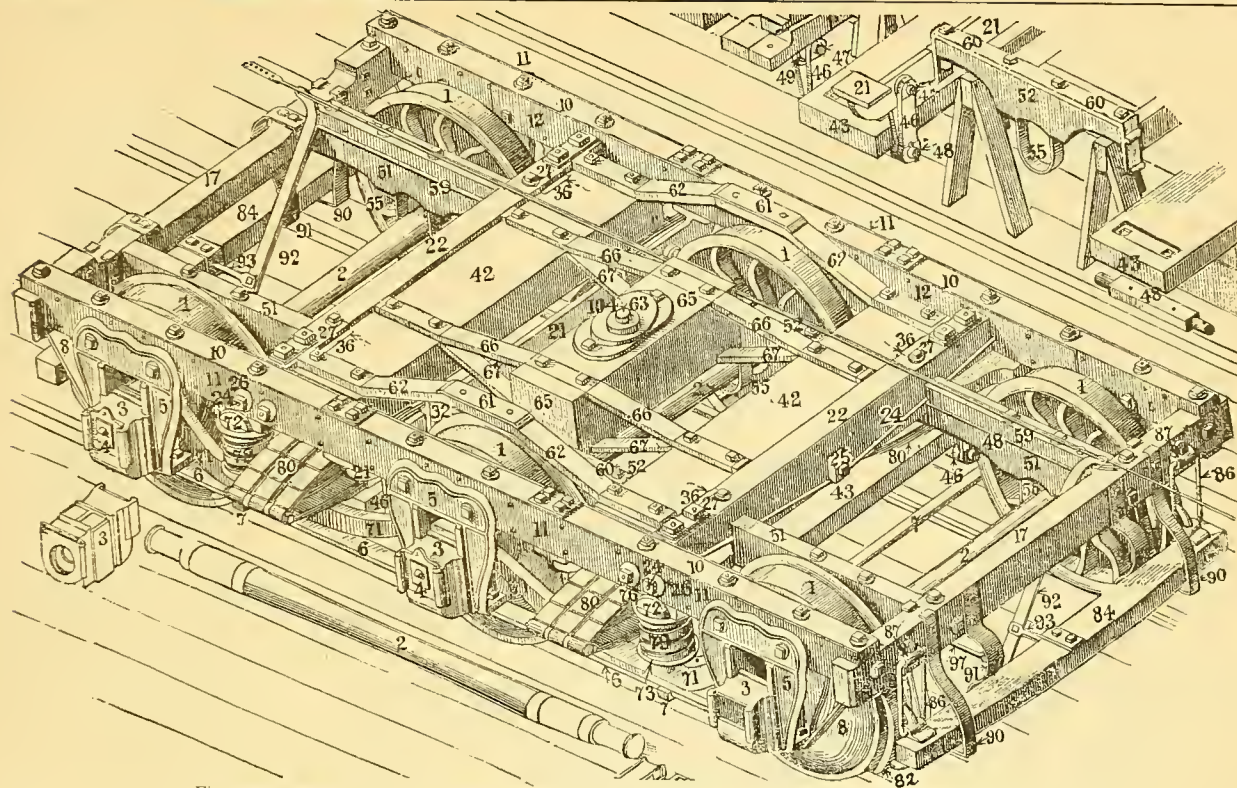


Fig. 1969. SIX-WHEEL PASSENGER-CAR TRUCK, PULLMAN PALACE CAR COMPANY. *Perspective View.*

- 72. Equalizing-bar Spring-cap.
- 73. Equalizing-bar Spring-seat.
- 76. Spring-block.
- 77. Jaw-bit (Fig. 2025 only).
- 79. Equalizing-bar Spring.
- 80. Bolster-spring.
- 82. Brake-block.

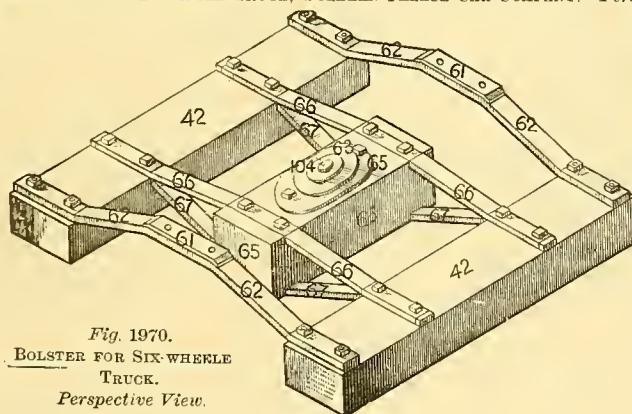


Fig. 1970.  
BOLSTER FOR SIX-WHEEL  
TRUCK.  
*Perspective View.*

- 84. Brake-beam.
- 86. Brake-hanger.
- 87. Brake-hanger Carrier.
- 90. Brake Safety-strap.
- 91. Release-spring.
- 92. Brake-lever.
- 93. Brake-lever Fulcrum.
- 97. Lower Brake-rod.
- 104. King-bolt, or Centre-pin.

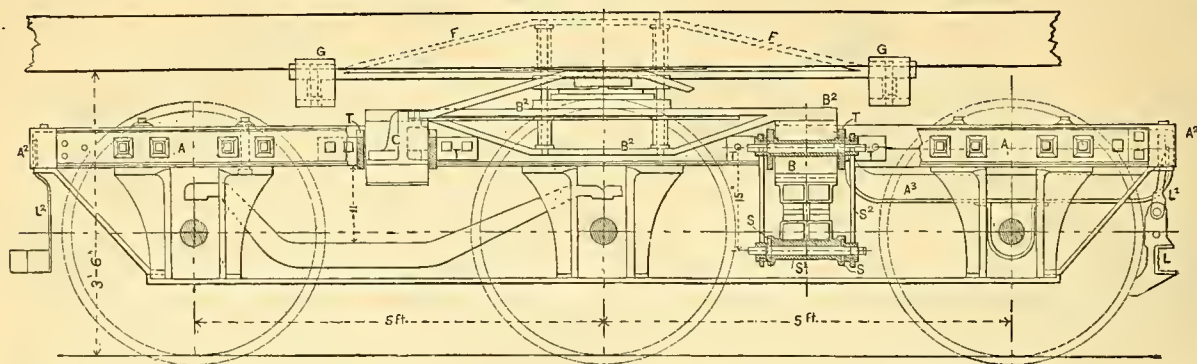


Fig. 1971. Side Elevation.

SIX-WHEEL IRON TRUCK FOR 60-FT. PARLOR CARS, PHILADELPHIA & READING RAILROAD.

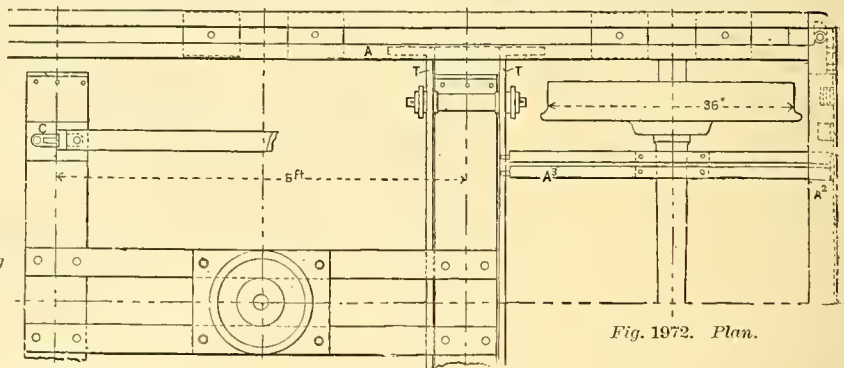


Fig. 1972. Plan.

NAMES OF PARTS; Figs. 1971-73.  
(Figures in parentheses refer to corresponding parts on previous page.)

- A. (11) Outside Wheel-bars.
- A<sub>3</sub>. (17) End-piece.
- A<sub>3</sub>. (51) Safety-beam.
- B. (42) Spring-beam (iron).
- B<sub>2</sub>. (66-7) Centre-bearing Arch-bars and Centre-bearing Inverted Arch-bar.
- C. (61) Truck Side-bearing.
- F. Body-bolster Truss.
- G. (1. Fig. 220.) Double Iron Body-bolster.
- L. (83) Brake-head.
- L<sub>1</sub>. (86) Brake-hanger.
- L<sub>2</sub>. (90) Brake Safety-strap.
- S. (43) Spring-plank Bars.
- S<sub>1</sub>. (48) Lower Swing-hanger Pivot.
- S<sub>2</sub>. (46) Swing-hangers.
- T. (22) Outside Transom.
- V. (47) Upper Swing-hanger Pivot.

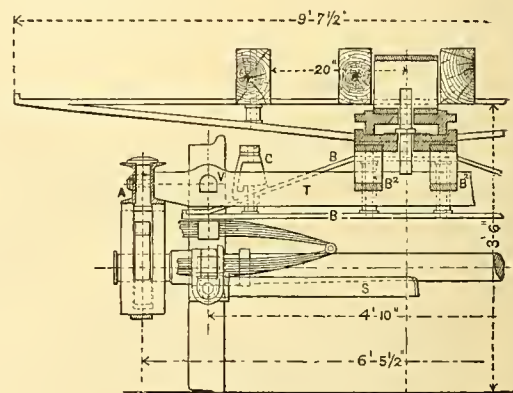
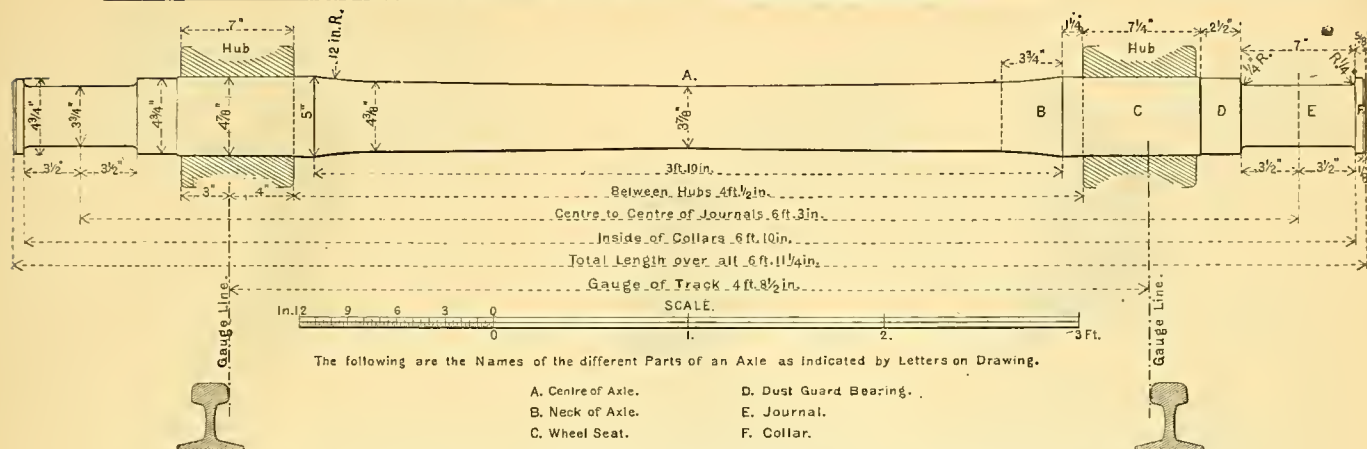


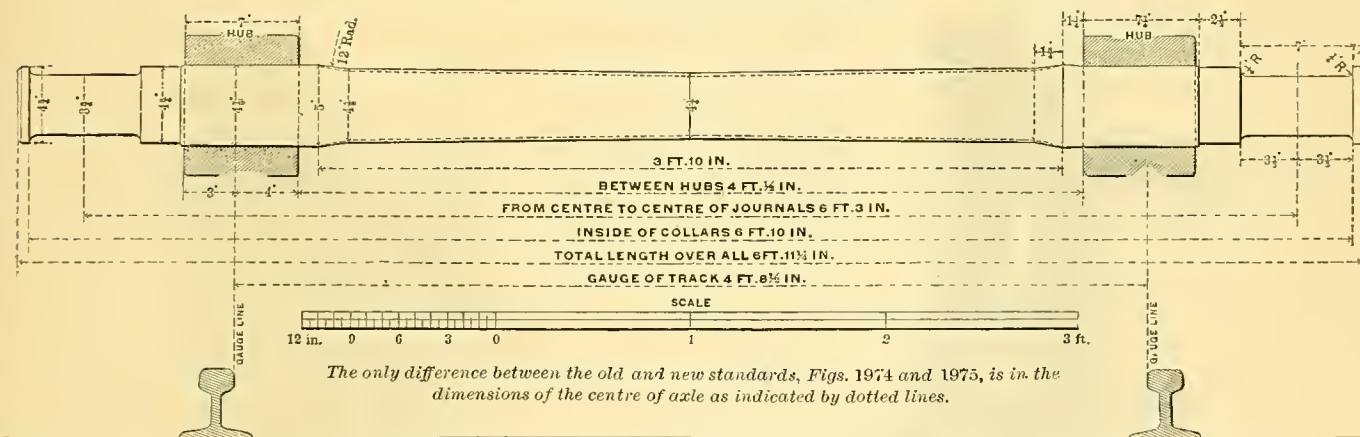
Fig. 1973. Cross-section.



The engraving represents the dimensions of the axle when finished. Weight, finished, 347 lbs.

Fig. 1974. MASTER CAR-BUILDERS' STANDARD AXLE. (Old Standard.)

(Adopted in 1879, and approved by both Master Car-Builders' and Master Mechanics' Associations.)



The only difference between the old and new standards, Figs. 1974 and 1975, is in the dimensions of the centre of axle as indicated by dotted lines.

Fig. 1975. MASTER CAR-BUILDERS' STANDARD AXLE. (New Standard.)

Adopted by Master Car-Builders' Association 1884, and approved by letter ballot. Not yet (1884) acted on by Master Mechanics' Association.)

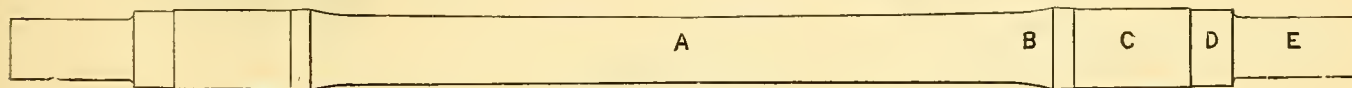


Fig. 1976. MULEY AXLE.

(Names of parts, same as in Fig. 1974, the COLLAR, F, being omitted in the Muley Axle.)





Fig. 1977.  
COMBINED BRAKE-SHOE AND HEAD.  
(Showing dovetail-joint and "Standard" split-key.)



Fig. 1978.  
BRAKE-HEAD.  
(Average wt., 10 lbs.)

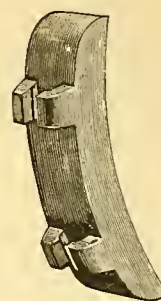


Fig. 1979.  
BRAKE-SHOE.  
(Average wt., 20 lbs., when  $\frac{3}{4}$ -in. thick.)

"STANDARD" BRAKE-SHOE AND HEAD.

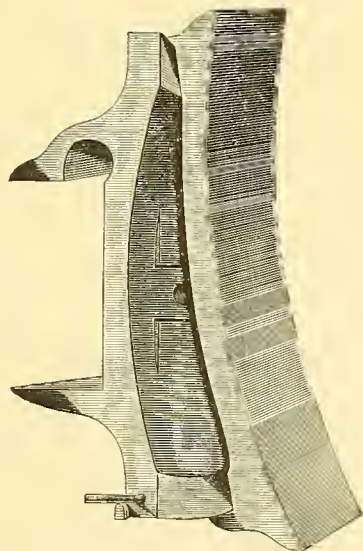


Fig. 1980.

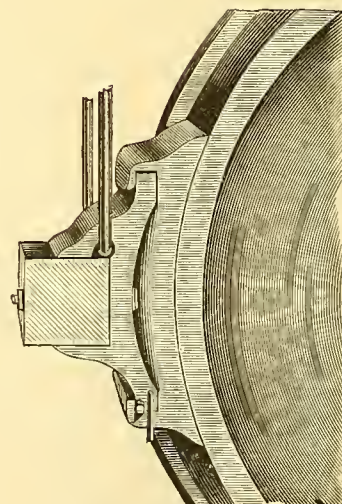


Fig. 1981.

BANNING BRAKE-SHOE.  
(Other Brake-shoes are shown among CAR-BODY DETAILS, BRAKE-GEAR; Figs. 227-231, and Figs. 237-238.)

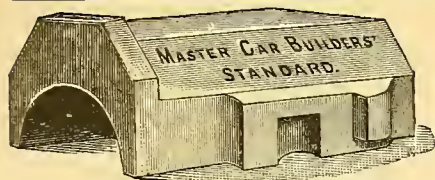


Fig. 1982.  
PERSPECTIVE VIEW OF JOURNAL-BEARING.

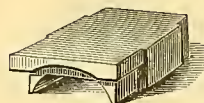


Fig. 1983.  
JOURNAL-BEARING KEY.  
(These drawings, Figs. 1983-4, are not precisely the M. C. B. Standards.)

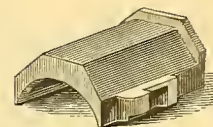


Fig. 1984.  
JOURNAL-BEARING.  
(These drawings, Figs. 1983-4, are not precisely the M. C. B. Standards.)

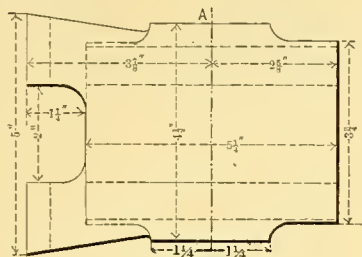


Fig. 1985.  
PLAN OF KEY.

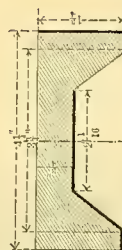


Fig. 1988.  
TRANSVERSE SECTION OF KEY ON  
LINE A.

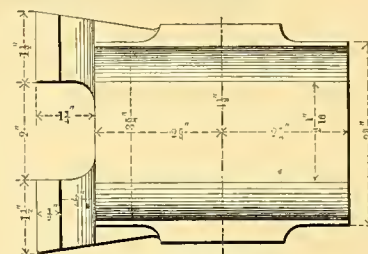


Fig. 1991.  
INVERTED PLAN OF KEY.  
(This drawing incorrectly represents the  
sloping interior faces of the key as curved.  
See section.)

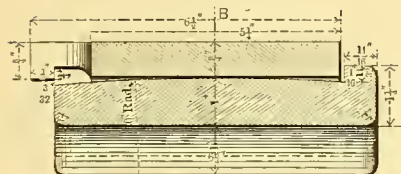


Fig. 1986.  
LONGITUDINAL SECTION OF KEY AND  
BEARING.

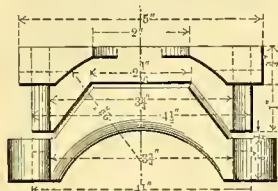


Fig. 1989.  
OUTSIDE END VIEW OF BEARING  
AND KEY.

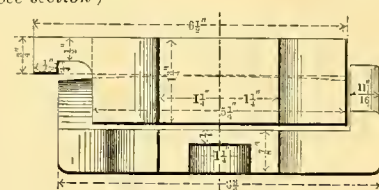


Fig. 1992.  
SIDE VIEW OF BEARING AND KEY.

Weight of Bearing, 9 lbs.

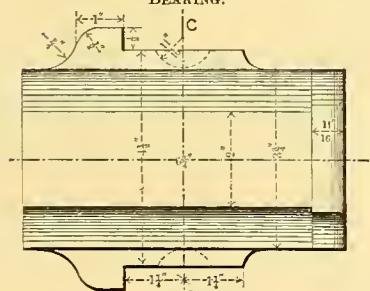


Fig. 1987.  
PLAN OF BEARING.

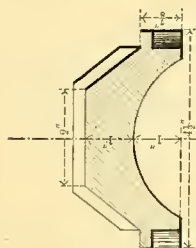
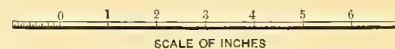


Fig. 1990.  
TRANSVERSE SECTION OF BEAR-  
ING ON LINE C D.



(This Standard was adopted at the Eighth  
Annual Convention, Cincinnati, 1874. Action  
reaffirmed at Fifteenth Annual Convention,  
New York, 1881.)

MASTER CAR-BUILDERS' STANDARD JOURNAL-BEARING AND JOURNAL-BEARING KEY.

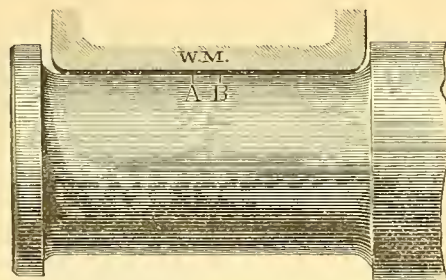


Fig. 1993. Longitudinal Section.

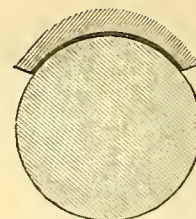


Fig. 1994. Cross Section.

HOPKINS LEAD-LINED OR SELF-FITTING JOURNAL-BEARING.

A B. Lead-lining.

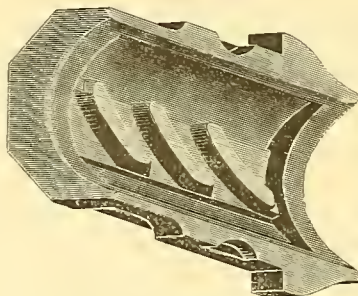
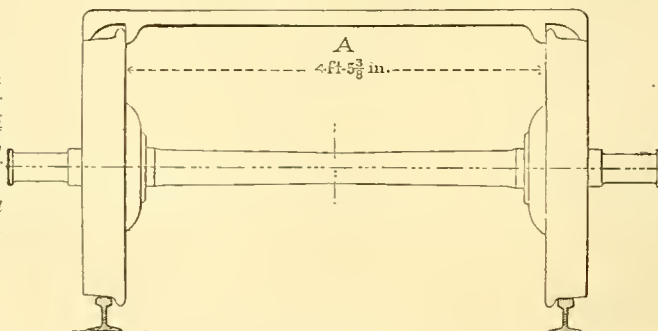


Fig. 1995.

"HERCULES" "BABBITT-METAL" BEARING.

(A standard limit of variation for this gauge, of  $\frac{1}{8}$  inch either way, or 4 ft.  $5\frac{1}{2}$  in. and 4 ft.  $5\frac{1}{4}$  in. as maximum and minimum, has been adopted by the Master Mechanics' Association and was favorably discussed, but not acted on, at the last (1884) M. C. B. Convention )



(For other standard wheel-gauges, see Figs. 2114-23.)

Fig. 1996.

MASTER CAR-BUILDERS' STANDARD DISTANCE-GAUGE BETWEEN BACKS OF FLANGES OF CAR-WHEELS.

(This distance [4 ft.  $5\frac{1}{2}$  in.] was proposed in a resolution adopted at the 17th Annual Convention of the Master Car-Builders' Association, Chicago, 1883, and was afterwards submitted to and approved by a letter ballot.)





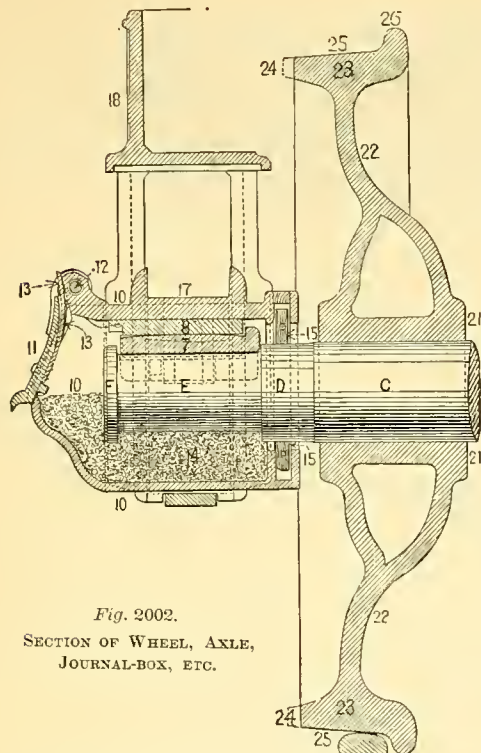


Fig. 2002.  
SECTION OF WHEEL, AXLE,  
JOURNAL-BOX, ETC.

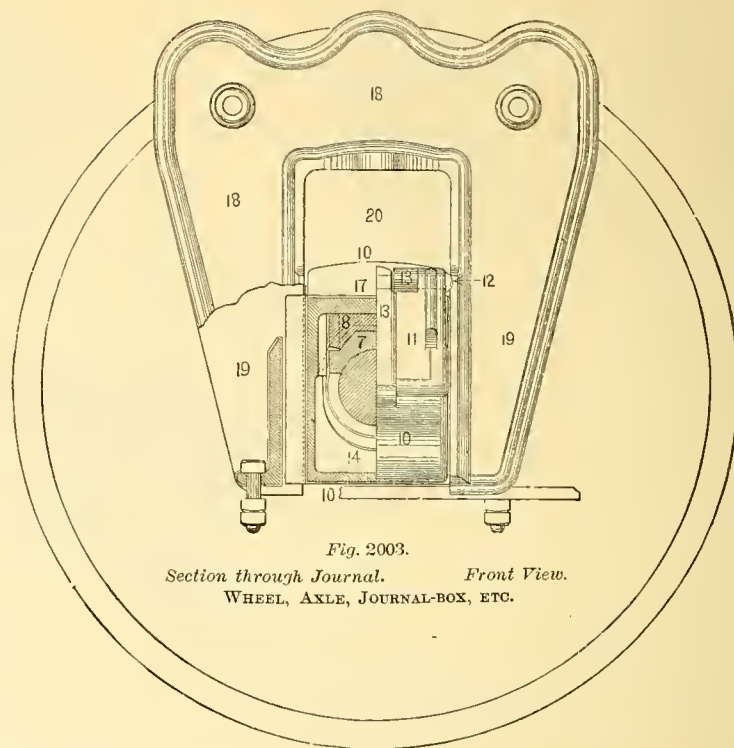


Fig. 2003.  
Section through Journal. Front View.  
WHEEL, AXLE, JOURNAL-BOX, ETC.

(These drawings do not give the Master Car-Builders' Standard Journal-box and Pedestal, for which see previous page and Figs. 2031-24.

NAMES OF PARTS; Figs. 2002-2012.

- |                         |                                  |  |                                     |
|-------------------------|----------------------------------|--|-------------------------------------|
| A. Centre, of Axle.     | 9. Stop-key Journal-bearing.     | 15. Dust-guard and Dust-guard Chamber. | 23. Rim, of Wheel.                  |
| B. Neck, of Axle.       | 10. Journal-box.                 | 16. Dust-collar.                       | 24. Face, of Rim.                   |
| C. Wheel-seat.          | 11. Journal-box Cover.           | 17. Equalizing-bar Seat.               | 25. Tread of Wheel, or Wheel-tread. |
| D. Dust-guard Bearing.  | 12. Journal-box Cover Hinge-pin. | 18. Pedestal.                          | 26. Wheel-flange.                   |
| E. Journal.             | 13. Journal-box Cover Spring.    | 19. Pedestal-horns.                    | 27. Journal-bearing Stop-key.       |
| F. Axle-collar.         | 14. Journal-packing.             | 20. Pedestal-jaw.                      | 28. Oil-cellar.                     |
| 3. Stop-plate.          |                                  | 21. Hub, of Wheel.                     | 29. Stop Journal-bearing.           |
| 7. Journal-bearing.     |                                  | 22. Wheel-plate.                       |                                     |
| 8. Journal-bearing Key. |                                  |  |                                     |

Numbers refer to List of Names of Parts on preceding page.

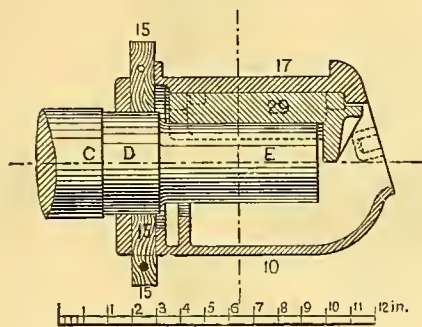


Fig. 2004. Section.

WRIGHT'S STOP JOURNAL-BEARING.

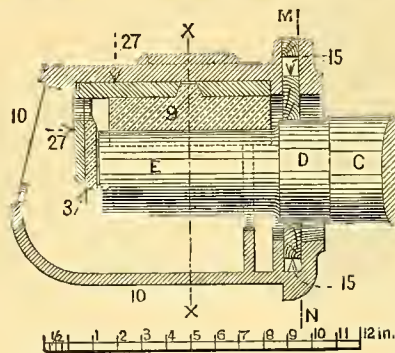


Fig. 2005. Section.

BISSEL'S STOP-KEY JOURNAL BEARINGS.

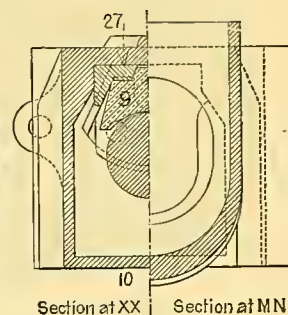


Fig. 2006.

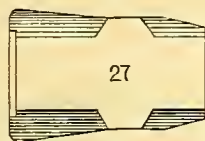


Fig. 2007. Plan.



Fig. 2008. Side View.

BISSEL'S JOURNAL-BEARING STOP-KEY.

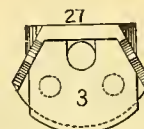


Fig. 2009. Back End View.

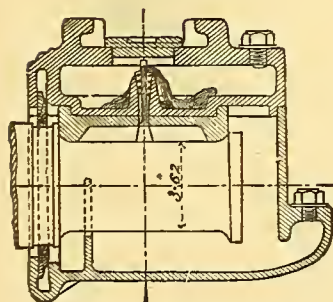


Fig. 2010. Section.

TOP-RESERVOIR JOURNAL-BOX.

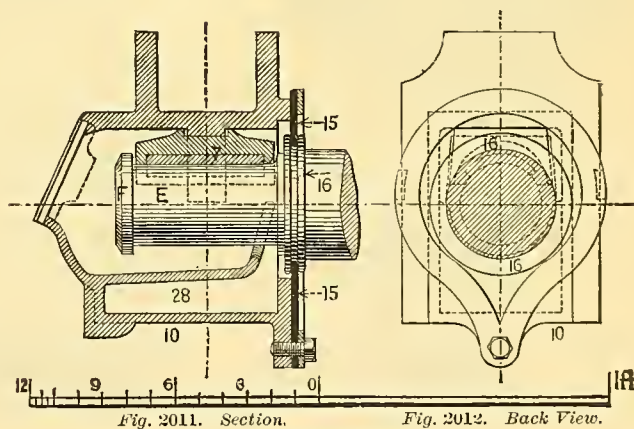


Fig. 2011. Section.

Fig. 2012. Back View.

TIM'S JOURNAL-BOX.



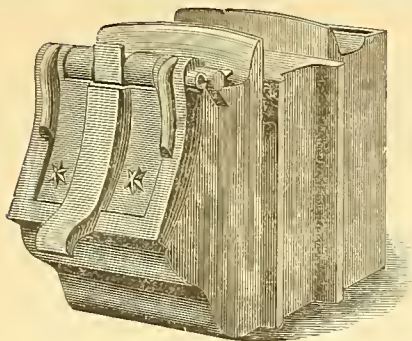


Fig. 2013. Perspective View.  
JOURNAL-BOX, with SPRING LID.  
(See also Figs. 2002-2003.)

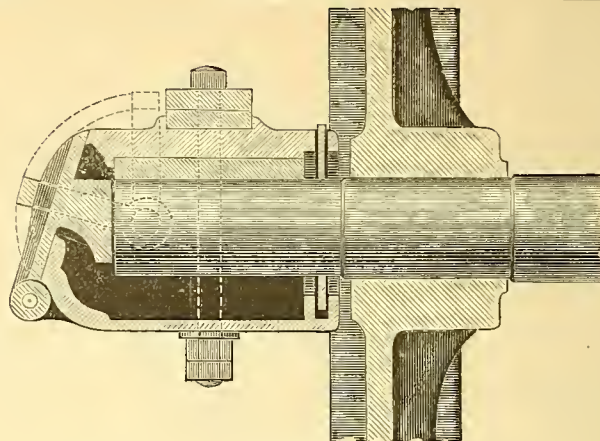


Fig. 2014.

RAOUL JOURNAL-BOX. Showing YOKE or BAIL and END-STOP.  
(A sliding cap instead of the yoke is also used, which raises vertically and sits in a recess, for packing and oiling, but falls of its own gravity into place when jarred.)

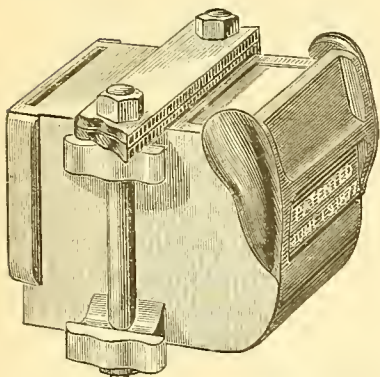


Fig. 2015. Journal-box Lid, closed.



Fig. 2016. Lid detached.  
HEWITT JOURNAL-BOX LID.

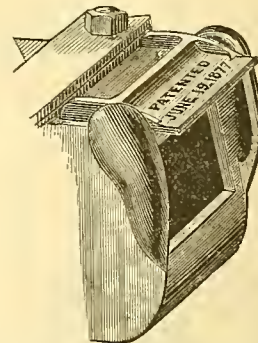


Fig. 2017. Journal-box Lid, open.



Fig. 2018.  
DUST GUARD.

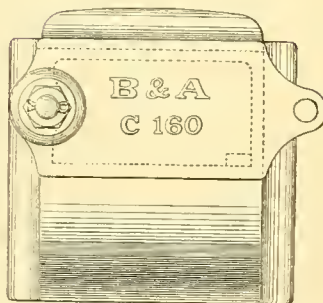
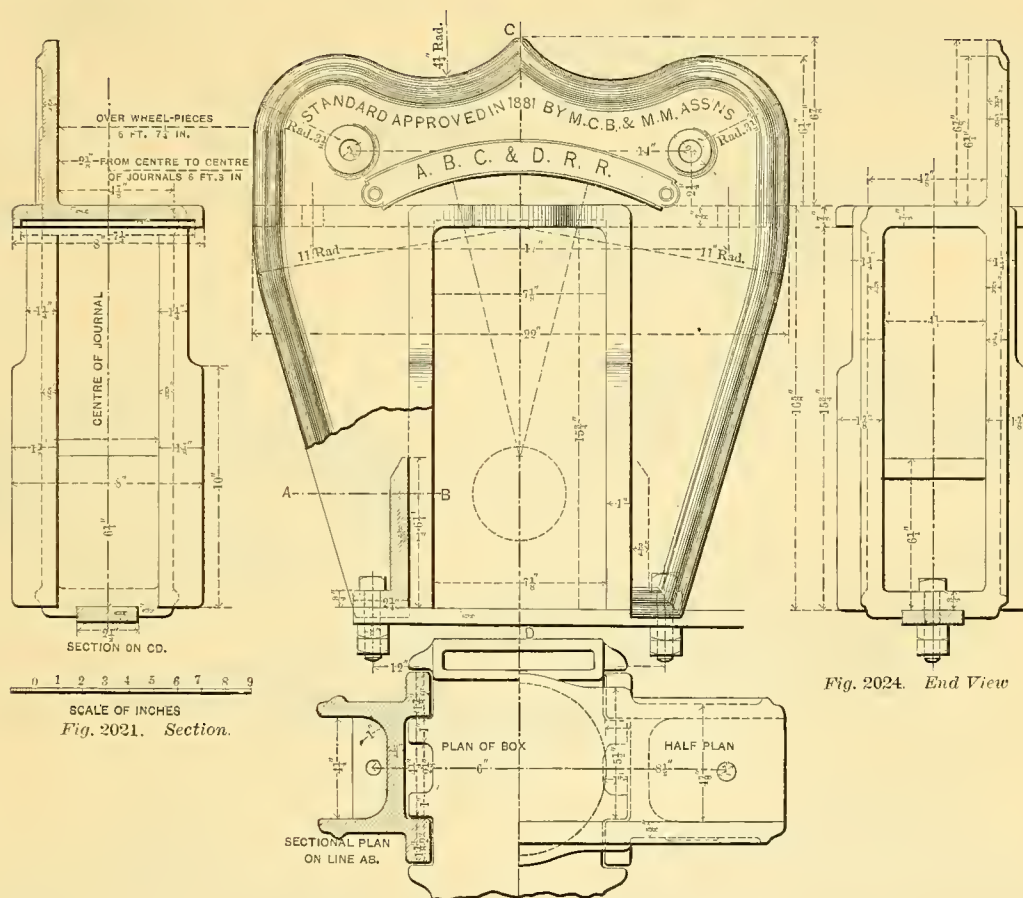


Fig. 2019. Front View.

FLETCHER JOURNAL-BOX LID.



Fig. 2020. Side View.



Figs. 2022-2023.  
Elevation and Plan.

MASTER CAR-BUILDERS' STANDARD PEDESTAL.

(This standard was adopted at the Eighth Annual Convention, Cincinnati, 1874. Action reaffirmed at Fifteenth Annual Convention, New York, 1881.)

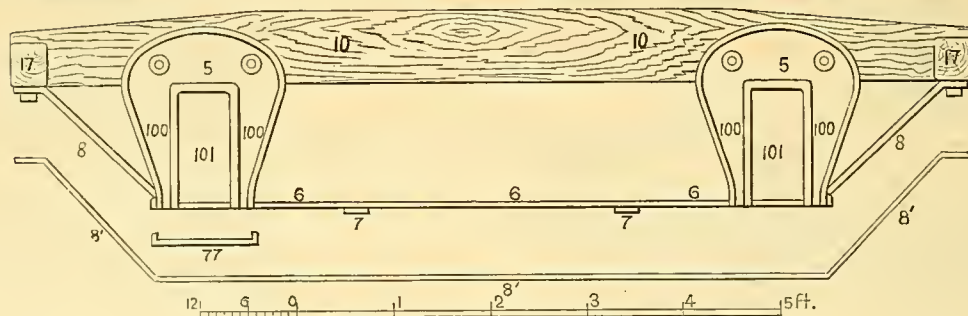


Fig. 2025. Side View.  
SIDE-FRAME OF WOODEN CAR-TRUCK.

NAMES OF PARTS : Fig. 2025.

- 5. Pedestal.
- 6. Pedestal Tie-bar.
- 7. Pedestal Stay-rod.

- 8. Pedestal-brace.
- 8'. Pedestal-brace Tie-bar.
- 10. Wheel-piece.
- 17. End-piece, of Truck-frame.

- 77. Jaw-bit.
- 100. Pedestal-horns.
- 101. Pedestal-jaw.

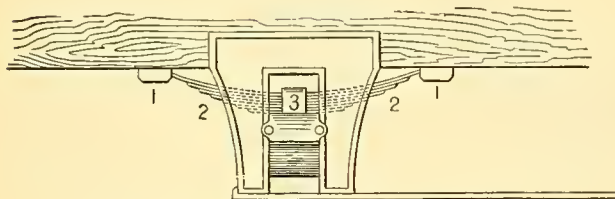


Fig. 2026. Side View.  
PEDESTAL, WITH HALF-ELLIPTIC JOURNAL-SPRING.

- 1. Half-elliptic Spring Bearing.
- 2. Half-elliptic Spring.
- 3. Spring-band.

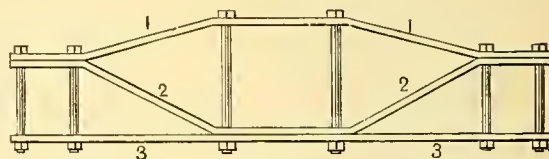


Fig. 2027. Side View.  
SIDE-FRAME OF DIAMOND-TRUCK.

- 1. Arch-bar.
- 2. Inverted Arch-bar.
- 3. Pedestal Tie-bar.

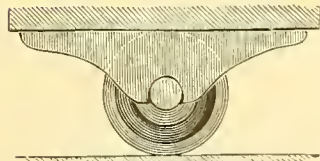


Fig. 2028.  
ROLLER SIDE-BEARING.  
Side View.



Fig. 2029.  
FRAMED SPRING-PLANK.  
Plan.

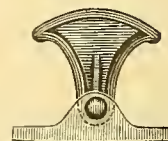


Fig. 2030.  
ROCKER SIDE-BEARING.





Fig. 2031. HALF ELLIPTIC SPRING.  
1. Spring-band. 2. Set, or Arch.

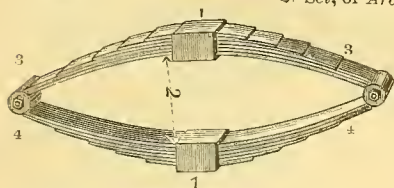


Fig. 2032. ELLIPTIC SPRING.  
1. Spring-band.  
2. Set, of Spring.  
3. Scroll.  
4. Eye-bolt.  
— Length is understood to be from centre to centre of scrolls when unloaded.  
— Arch is half the set.

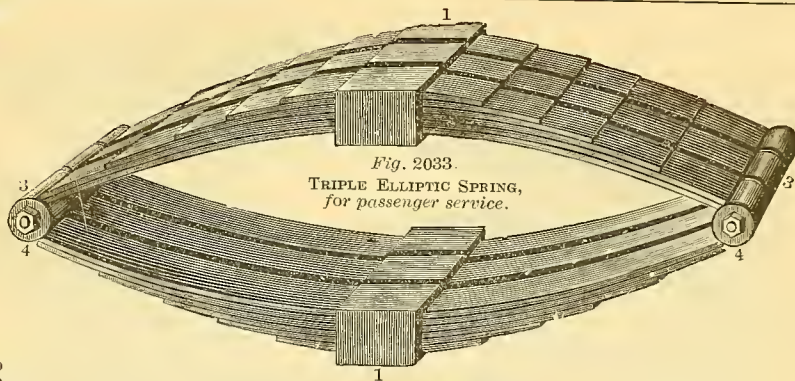


Fig. 2033.  
TRIPLE ELLIPTIC SPRING,  
for passenger service.

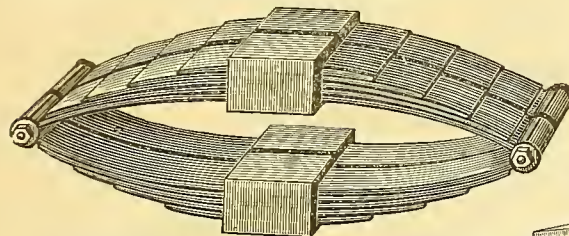


Fig. 2034. DOUBLE ELLIPTIC SPRING, for freight service.

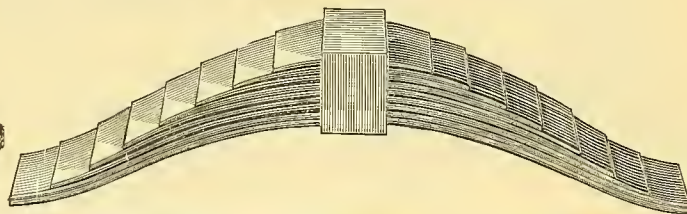


Fig. 2035. HALF-ELLIPTIC BOLSTER-SPRING, for freight service.

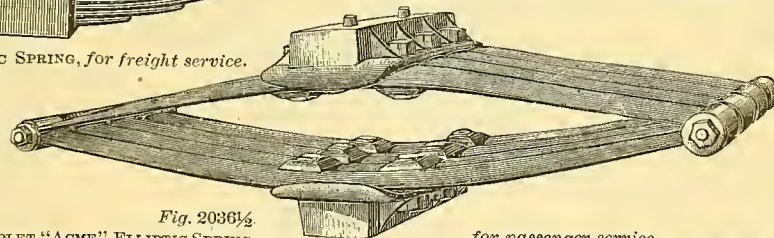


Fig. 2036 1/2.  
TRIPLET "ACME" ELLIPTIC SPRING,  
for passenger service.

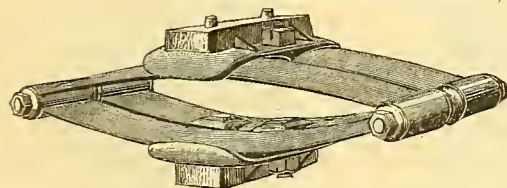


Fig. 2036. DOUBLE, OR DUPLICATE "ACME" ELLIPTIC SPRING, for freight service.

(This spring, Figs. 2036-2036 1/2, has a single leaf, tapered, and is the original form of "Acme" Spring. See Figs. 2138-9.)

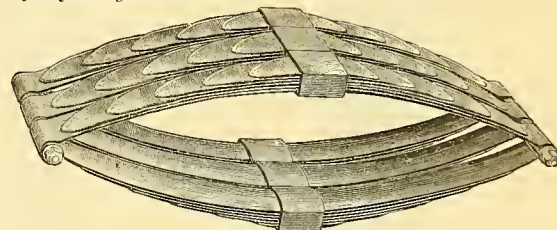


Fig. 2037. CONCAVE ELLIPTIC SPRING.  
(36 in.  $\times$  12 1/2 in. high, 6 leaves; main, 3  $\times$  1 1/4 in.; others, 3  $\times$  3-16 in. Weight, 183 lbs. Capacity, 9,500 lbs., half exhausted.)

According to the number of single springs coupled together elliptic springs are designated as DOUBLE or DUPLICATES, TRIPLE or TRIPLTS, QUADRUPLS, QUINTUPLES, and SEXTUPLES.

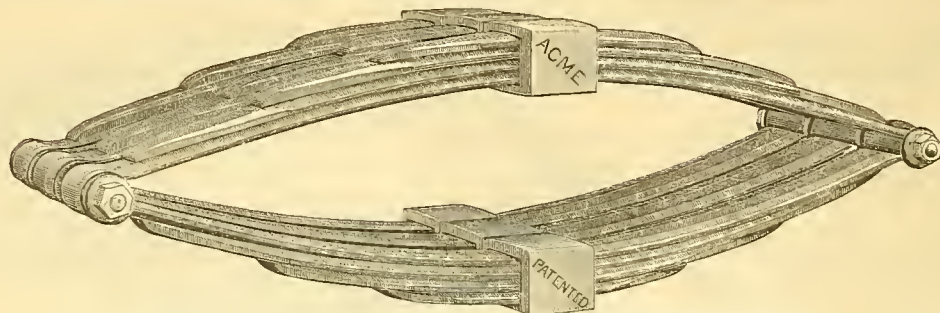


Fig. 2038. "IMPROVED ACME" ELLIPTIC SPRING, TRIPLET, for passenger service.

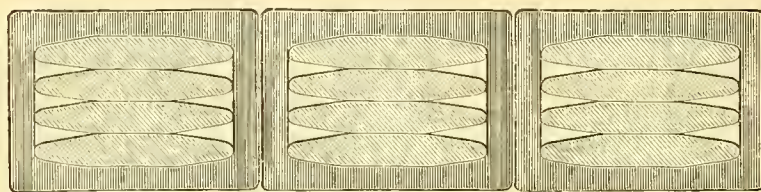


Fig. 2039. Section of Fig. 2038 (one-fourth full size).

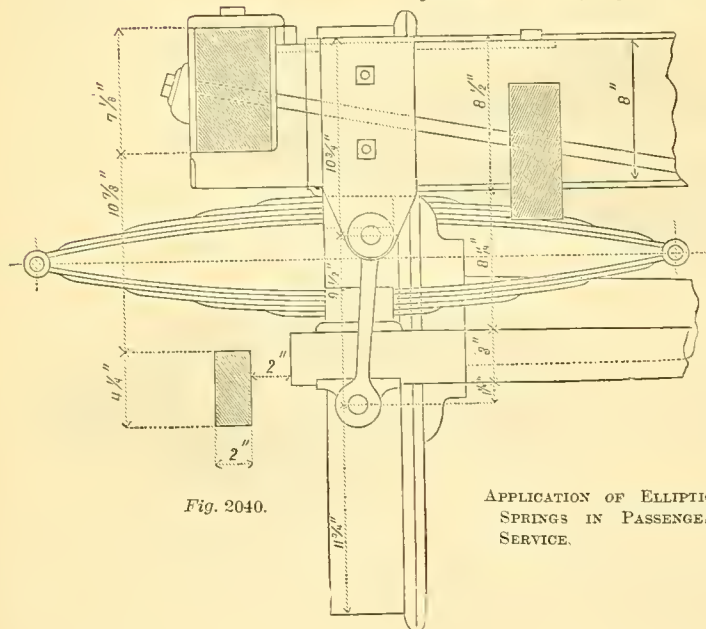


Fig. 2040.

APPLICATION OF ELLIPTIC  
SPRINGS IN PASSENGER  
SERVICE.



Fig. 2041.  
COMBINATION ELLIPTIC SPRING.  
(Little used.)

(Fig. 2040 corresponds with the practice of many railroads, with slight variations of details, and is that recommended by a prominent firm of spring manufacturers as giving the best results with elliptic springs.)



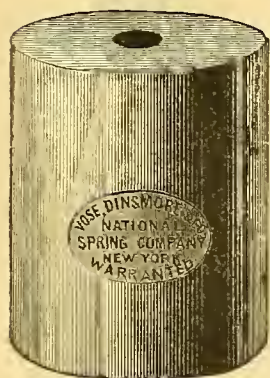


Fig. 2042.  
INDIA-RUBBER SPRING.

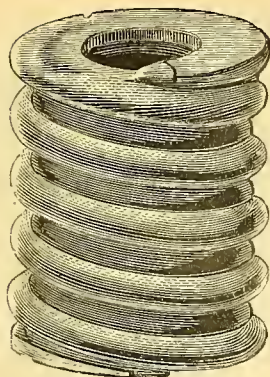


Fig. 2043.  
COMPOUND SPIRAL-SPRING.

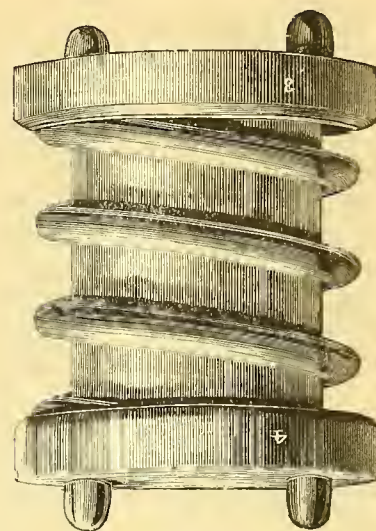


Fig. 2044.  
RUBBER-CENTRE SPIRAL-SPRING.  
3. Spring-seat.  
4. Spring-cap.

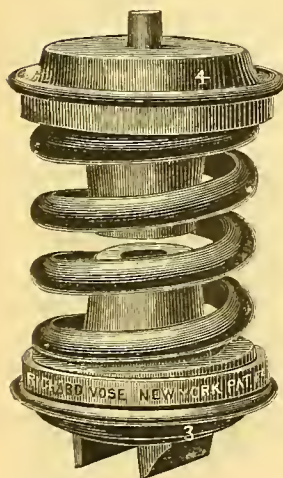


Fig. 2045.  
"VOSE" GRADUATED SPIRAL-SPRING.  
3. Spring-seat. 4. Spring-cap.



Fig. 2046.  
EIGHT-GROUP WOOL-PACKED SPIRAL-SPRING.

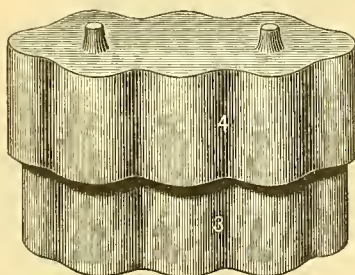


Fig. 2047.  
OUTSIDE-VIEW OF SPRING-CASE FOR EIGHT-GROUP WOOL-PACKED SPIRAL-SPRING.



Fig. 2048.  
SMALL RUBBER-CENTRE SPIRAL-SPRING.

(All forms of Springs shown on this page are now rarely, if ever, used.)



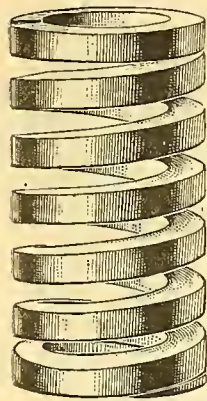


Fig. 2049.  
SQUARE-BAR SINGLE-COIL  
SPRING.



Fig. 2050.  
KEG-SHAPED SPIRAL-SPRING.

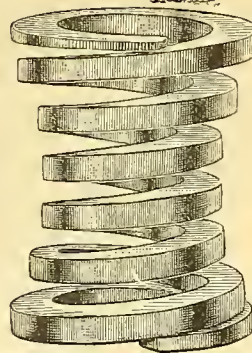


Fig. 2051.  
SPOOL-SHAPED SPIRAL-SPRING.

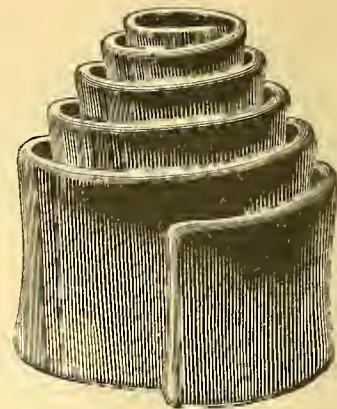


Fig. 2052.  
VOLUTE SPRING.

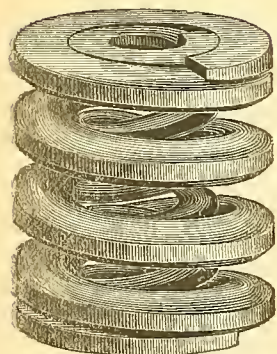


Fig. 2053.  
OVAL-BAR DOUBLE-COIL BUFFER  
[SPRING.

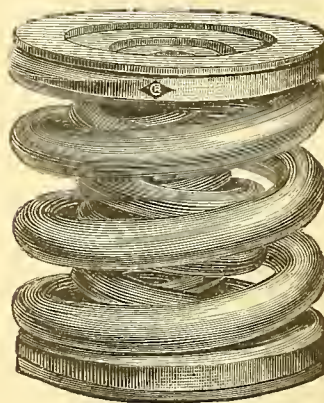


Fig. 2054.  
ROUND-BAR TRIPLE-COIL GRADUATED SPRING.

(For other graduated springs see Figs. 2095-2106.)

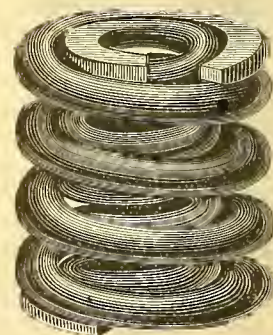


Fig. 2055.  
ROUND-BAR DOUBLE-COIL BUFFER  
SPRING.  
(Capacity, 16,000 to 18,000 lbs.)

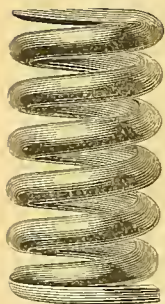


Fig. 2056.  
ROUND-BAR SINGLE-COIL  
SPIRAL SPRING.

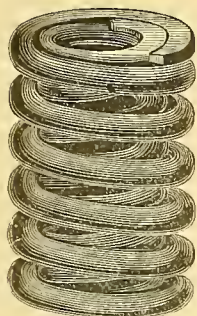


Fig. 2057.  
ROUND-BAR DOUBLE-COIL  
SPIRAL SPRING OR NEST-SPRING.

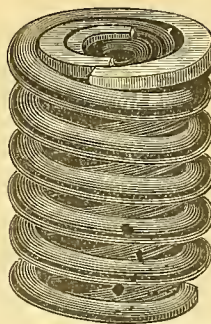


Fig. 2058.  
ROUND-BAR TRIPLE-COIL  
SPIRAL SPRING OR NEST-SPRING.



Fig. 2059.  
HALF-ROUND DOUBLE-COIL SPIRAL SPRING OR  
NEST-SPRING.

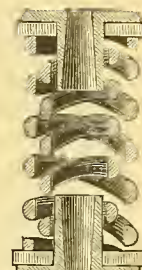


Fig. 2060.  
Section.

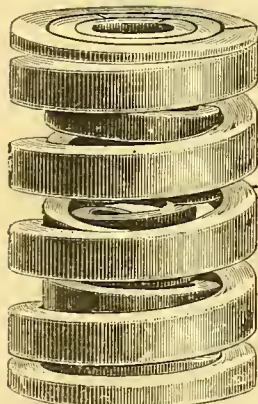


Fig. 2061.  
FLAT-BAR OR EQUAL-BAR TRIPLE-  
COIL SPIRAL SPRING OR  
NEST-SPRING.

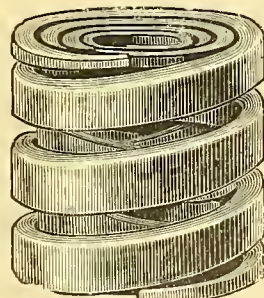


Fig. 2062.  
"HIEBARD" OR FLAT-BAR QUADRUPLE-  
COIL NEST-SPRING.



Fig. 2063.  
EDGE-ROLLED SPIRAL SPRING.

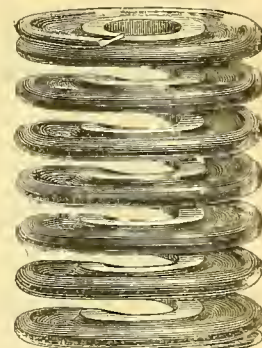


Fig. 2063 1/2.  
"PARAGON" SPIRAL SPRING.  
(Little used.)

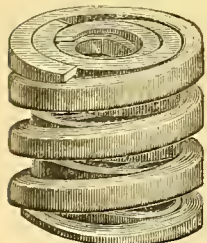


Fig. 2064 1/2.  
SQUARE-BAR TRIPLE-COIL  
NEST-SPRING

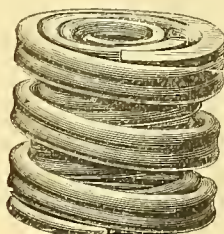


Fig. 2065.  
"DINSMORE" SPIRAL SPRING.

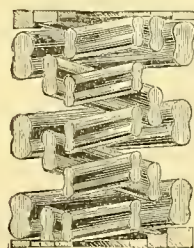


Fig. 2066.  
Section of Fig. 2065.



Fig. 2064.  
Section of Fig. 2063 1/2.



3. Spring-seat. 4. Spring-cap.

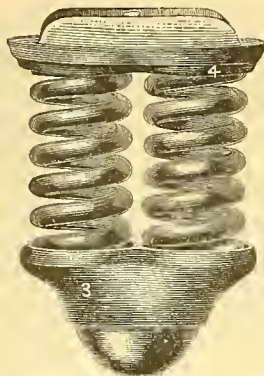


Fig. 2067. SINGLE-COIL EQUALIZER-SPRING.

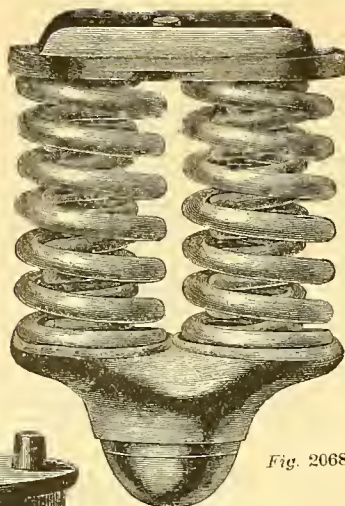


Fig. 2068.

DOUBLE-COIL EQUALIZER-  
SPRING.

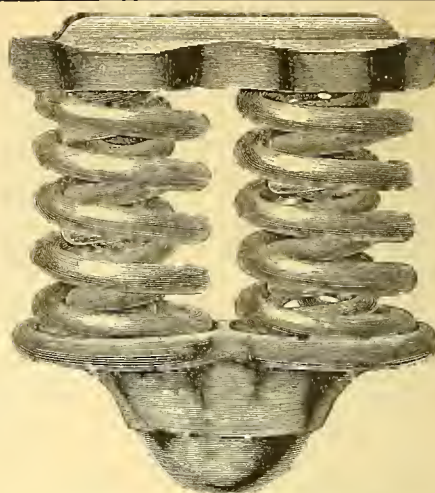


Fig. 2069. TRIPLE-COIL EQUALIZER-SPRING.

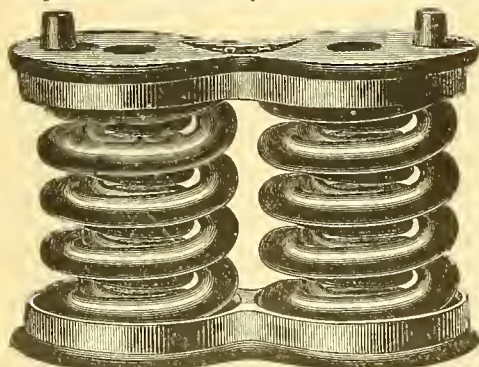


Fig. 2070. DOUBLE-COIL BOLSTER-SPRING.

Two-group  
Spiral Springs,  
Showing SPRING-PLATES,  
or Spring-seats and  
Spring-caps.

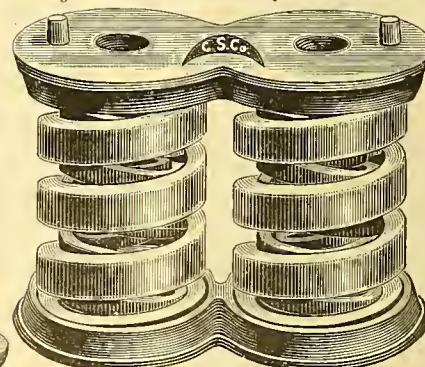


Fig. 2071. TRIPLE-COIL FLAT-BAR  
BOLSTER-SPRING.

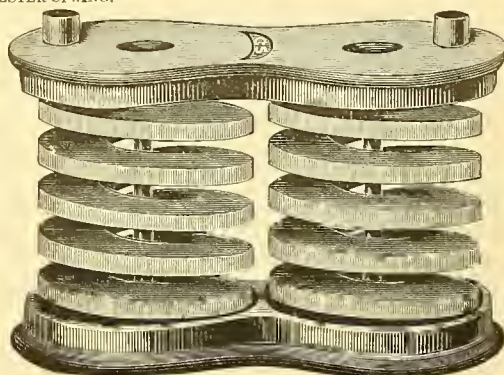


Fig. 2072. EDGE-ROLLED BOLSTER-SPRING.





Fig. 2073.  
ROUND-BAR BOLSTER-SPRING  
(for 15-ton car.)

Three-group  
Spiral Springs.

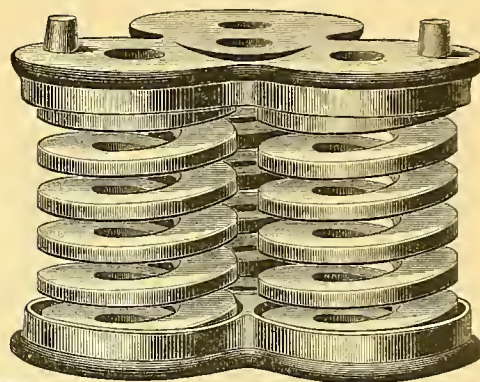


Fig. 2074.  
EDGE-ROLLED BOLSTER-SPRING  
(for 15-ton car.)

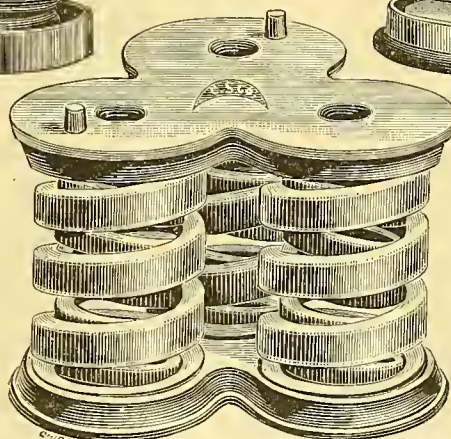


Fig. 2075.  
DOUBLE-COIL FLAT-BAR  
BOLSTER-SPRING  
(for 10-ton car.)

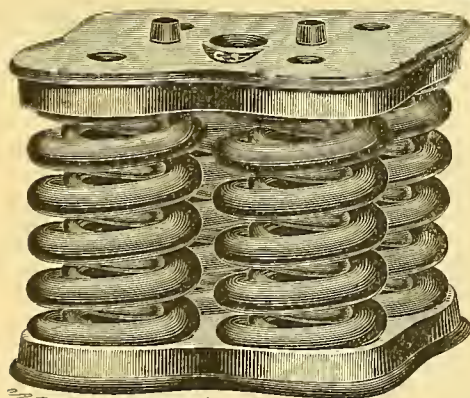


Fig. 2076. DOUBLE-COIL ROUND-BAR BOLSTER-SPRING  
(for 20-ton car, 6 to 8 in. high.)

Four-group  
Spiral Springs,  
Showing SPRING-  
PLATES, or Spring-  
seats and Spring-  
caps.

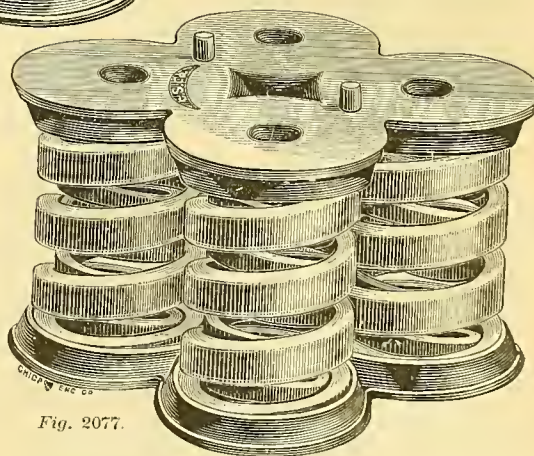


Fig. 2077.

DOUBLE-COIL FLAT-BAR BOLSTER-SPRING (for 15-ton car.)



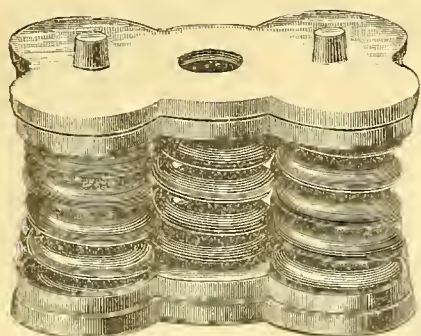


Fig. 2078. FIVE-GROUP SINGLE-COIL ROUND-BAR BOLSTER-SPRING.

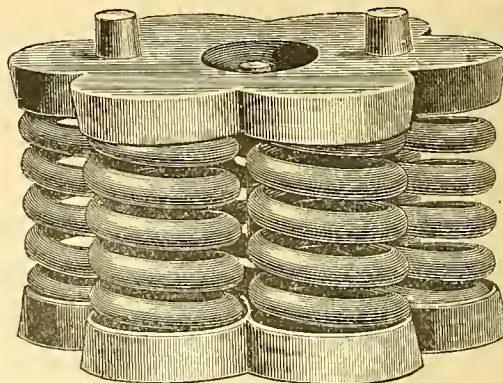


Fig. 2079. SIX-GROUP SINGLE-COIL ROUND-BAR BOLSTER-SPRING.

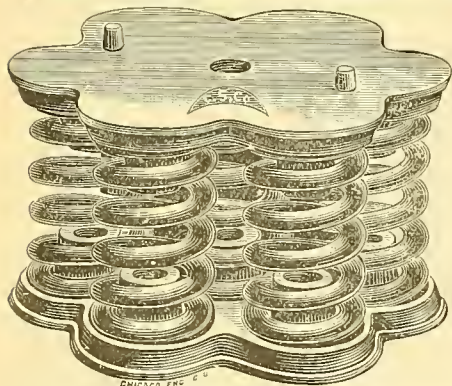


Fig. 2080.  
SEVEN-GROUP SINGLE-COIL ROUND-BAR  
BOLSTER-SPRING.  
(For 15-ton car; 6¼ in. high.)

Five-group to Eight-  
group Spiral Springs,

Showing SPRING-PLATES, or  
Spring seats and Spring-  
caps.



Fig. 2081.  
EIGHT-GROUP SINGLE-COIL ROUND-BAR  
BOLSTER SPRING.  
(For 15 to 18-ton car.)

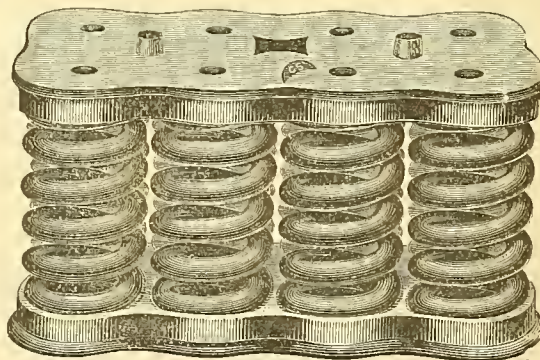


Fig. 2082.  
EIGHT-GROUP SINGLE-COIL ROUND-BAR BOLSTER-SPRING.



**Nine-group to Eleven-group Spiral Springs,**  
*Showing SPRING-PLATES, or Spring-seats and Spring-caps.*

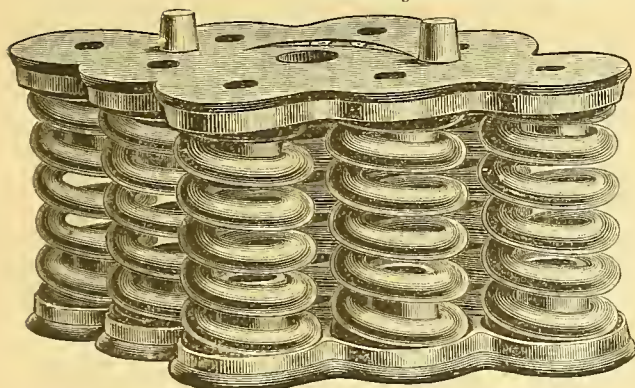


Fig. 2083. NINE GROUP SINGLE-COIL BOLSTER-SPRING.

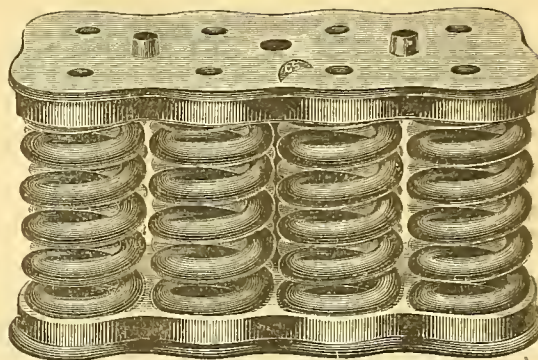


Fig. 2084. NINE-GROUP BOLSTER-SPRING.

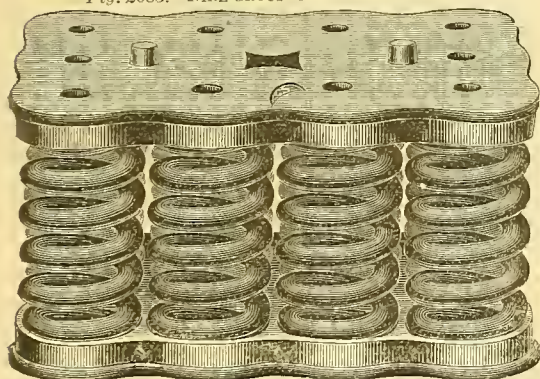


Fig. 2085. TEN-GROUP BOLSTER-SPRING.  
 (For 20-ton car;  $6\frac{1}{4}$  in. high)

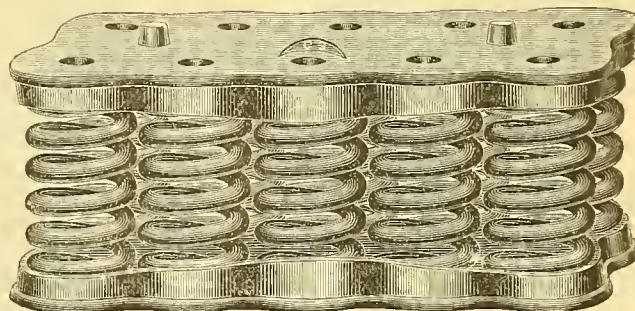


Fig. 2086. TEN-GROUP BOLSTER-SPRING.

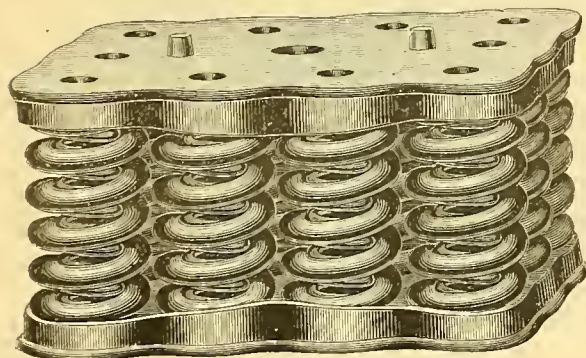


Fig. 2087. TEN-GROUP DOUBLE-COIL BOLSTER-SPRING.  
 (For 20-ton car;  $6\frac{1}{4}$  in. high.)

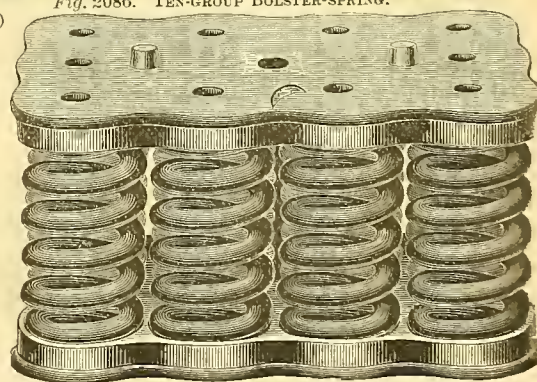


Fig. 2088. ELEVEN-GROUP BOLSTER-SPRING.



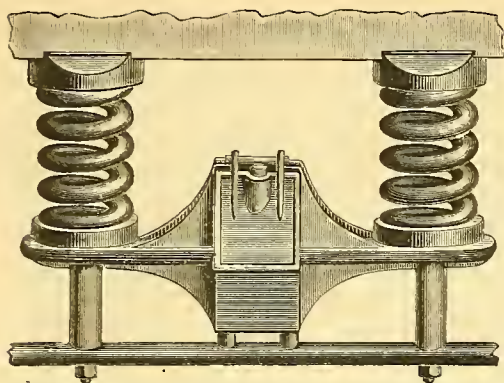


Fig. 2089.

PEDESTAL-SPRINGS FOR STREET CARS.

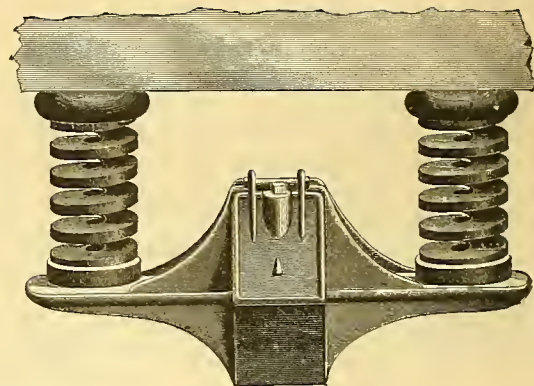


Fig. 2090.

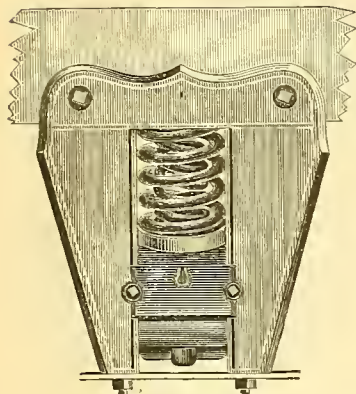


Fig. 2091.  
JOURNAL-SPRING.  
(Round-bar Double-coil.)

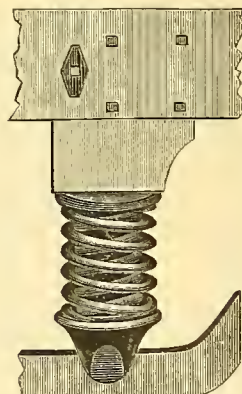


Fig. 2092.  
EQUALIZER-SPRING.  
(Round-bar Double-coil.)

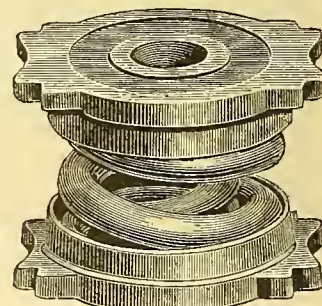


Fig. 2093.  
COAL-CAR PEDESTAL-SPRING.  
(Triple-coil.)

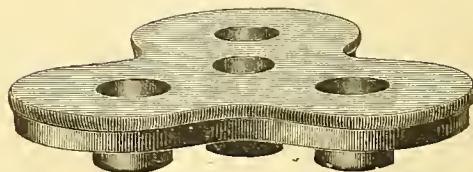


Fig. 2094.  
SPRING-PLATE (also termed SPRING-SEATS and SPRING-CAPS).

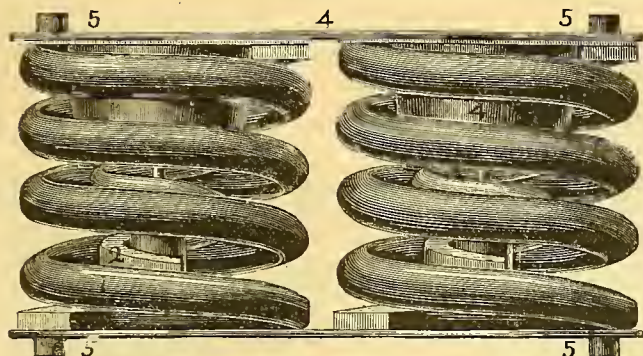


Fig. 2095. Side Elevation.

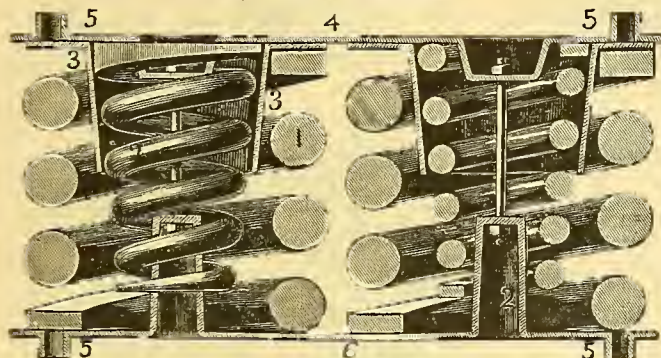


Fig. 2096. Section.

## GRADUATED TWO-GROUP BOLSTER-SPRING (for 25-ton car).

Motion,  $\frac{1}{4}$  in. per 1,000 lbs. to 6,000 lbs. Height,  $6\frac{3}{4}$  in. to 45-16 in.  
 1-16 in. " " 6,000 to 26,000 lbs. 21-16 in. total motion.

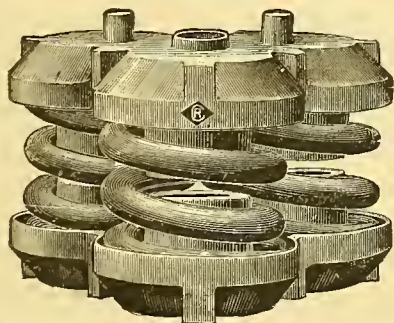


Fig. 2098. GRADUATED THREE-GROUP BOLSTER-SPRING.

Size,  $11\frac{1}{4} \times 7$  in. Weight,  $66\frac{1}{2}$  lbs. Capacity, graduated from 4,000 lbs. to 36,000 lbs. Total motion, 19-16 in.

Another graduated spring is shown in Fig. 2054.

## NAMES OF PARTS; Figs. 2095-6.

1. Outer-coil.
2. Inner-coil (and in Fig. 2096 only, Lower Cone).
3. (Fig. 2095) Outer Cone.
4. (Fig. 2096) Spring-cap, or Upper Spring-plate.
5. Spring-plate Lugs.
6. Spring-seat, or Lower Spring-plate.

## Graduated Springs.

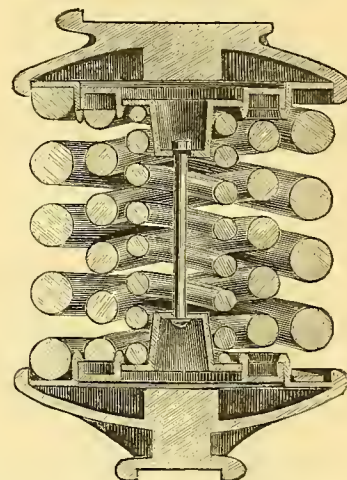
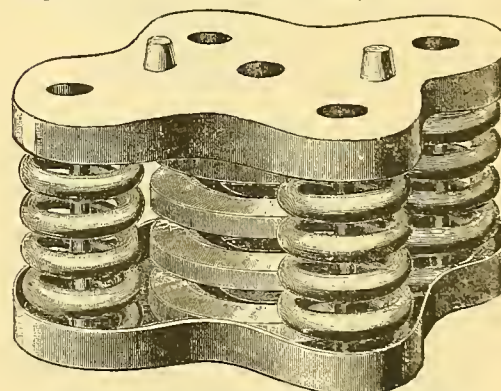


Fig. 2097. TRIPLE-COIL GRADUATED EQUALIZER SPRING.

Fig. 2099. GRADUATED FIVE-GROUP BOLSTER-SPRING.  
 Size,  $10 \times 12$  in. Capacity, 10,000 to 40,000 lbs.



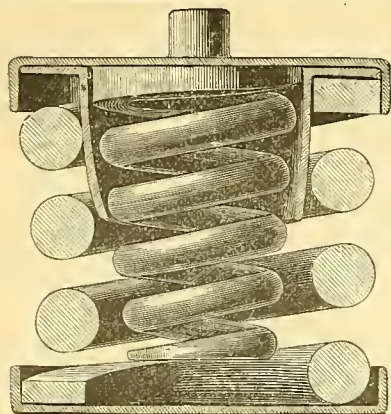


Fig. 2100.

DOUBLE-COIL GRADUATED BOLSTER-SPRING.  
Capacity, 9,000 lbs., with  $1\frac{1}{2}$  in. compression.  
12,000 " "  $1\frac{3}{8}$  " "  
Total motion 2 inches.

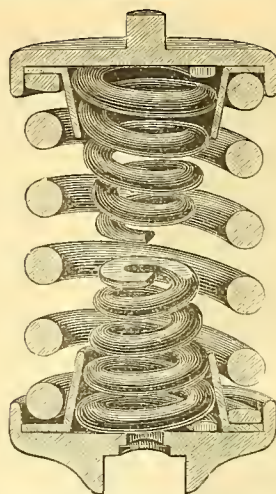


Fig. 2101. DOUBLE-COIL GRADUATED  
EQUALIZER-SPRING.

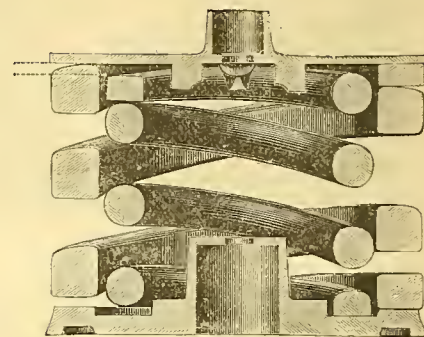


Fig. 2102.

DOUBLE-COIL GRADUATED BOLSTER-SPRING.

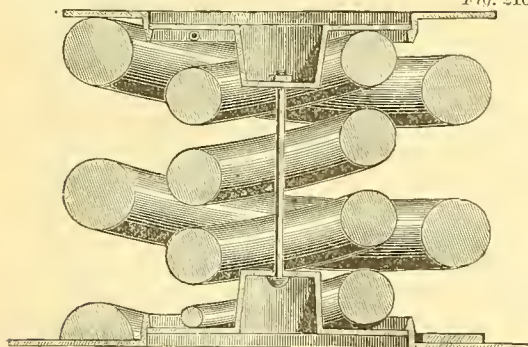


Fig. 2103. DOUBLE-COIL GRADUATED BOLSTER-SPRING.

Graduated  
Springs.

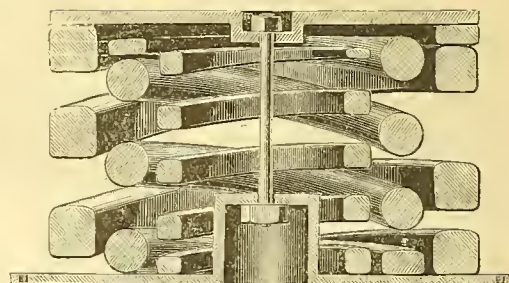


Fig. 2104. TRIPLE-COIL GRADUATED BOLSTER-SPRING.

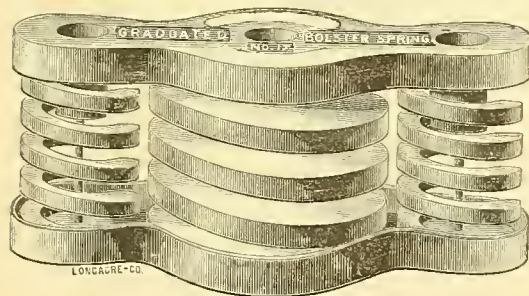


Fig. 2105. THREE-GROUP GRADUATED BOLSTER-SPRING.

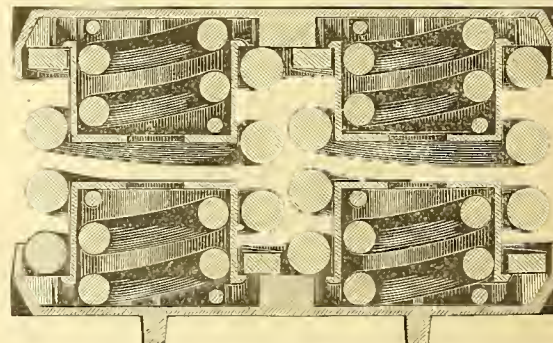


Fig. 2106. TWO-GROUP DOUBLE-COIL BOLSTER-SPRING, with Inside  
Spring-case.



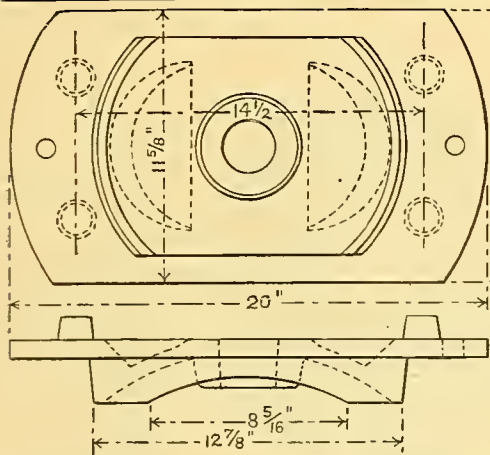


Fig. 2107.  
Body Centre-plate.

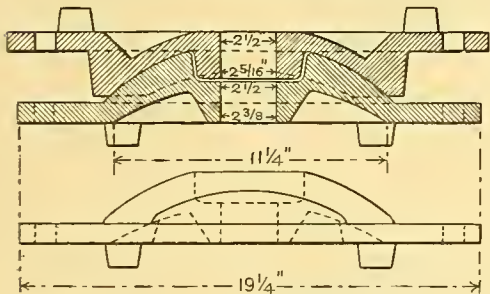


Fig. 2108.  
Section of both  
Centre-plates.

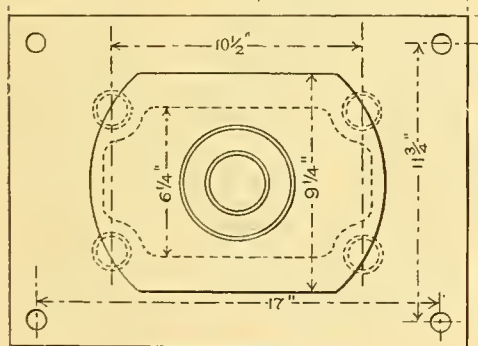


Fig. 2109.  
Truck-Centre-  
plate.

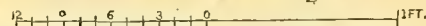
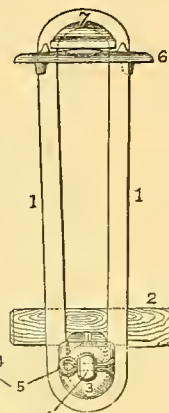
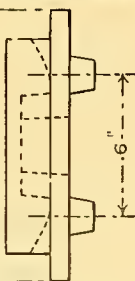


Fig. 2110.  
Fig. 2111.  
SWING-LINKS AND ATTACHMENTS, LAKE SHORE & MICHIGAN  
SOUTHERN RAILWAY AND CONNECTING LINES.

#### NAMES OF PARTS : Figs. 2110-11.

1. Swing Link-hanger.
2. Spring-plank.
3. (Fig. 2110) Cross-bar Casting, or Spring-plank Carrier.
3. (Fig. 2111) Swing-hanger Friction-washer (lower).
4. Cross-bar, or Mandrel-pin.
5. Split-key.
6. Swing-hanger Upper Bearing.
7. Swing-hanger Friction-washer (upper).



Fig. 2112. Cross-section.

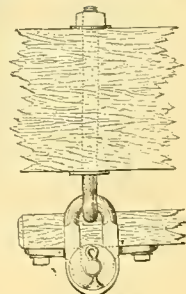
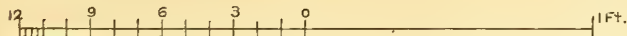


Fig. 2113. Side View.  
EYE-BOLT LINK-HANGER.  
(A SAFETY-GUARD, not shown, is  
attached to the transoms and  
passes under the spring-  
plank.)

#### NAMES OF PARTS ; Figs. 2112-13.

- Link-hanger Eye-bolt.  
Link-hanger.

(Other parts as in Figs. 2110-11.)



PULLMAN AND PENNSYLVANIA RAILROAD STANDARD PASSENGER CENTRE-PLATE.

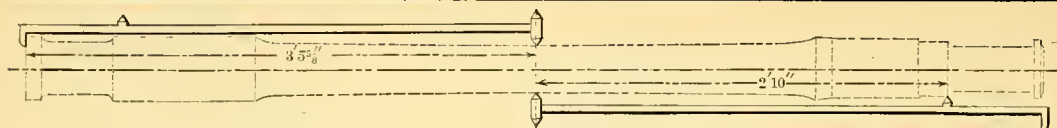


Fig. 2114. CENTERING GAUGE.

Fig. 2115. JOURNAL-SHOULDER GAUGE.

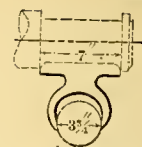


Fig. 2116.  
JOURNAL LENGTH AND  
DIAMETER GAUGE.

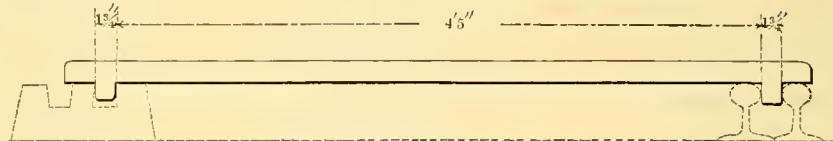


Fig. 2117. GUARD-RAIL GAUGE.

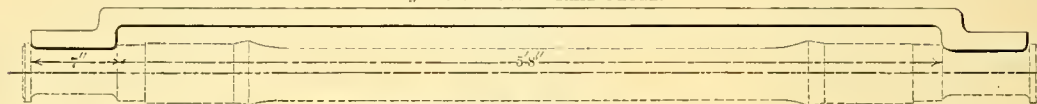


Fig. 2118. JOURNAL DISTANCE GAUGE.

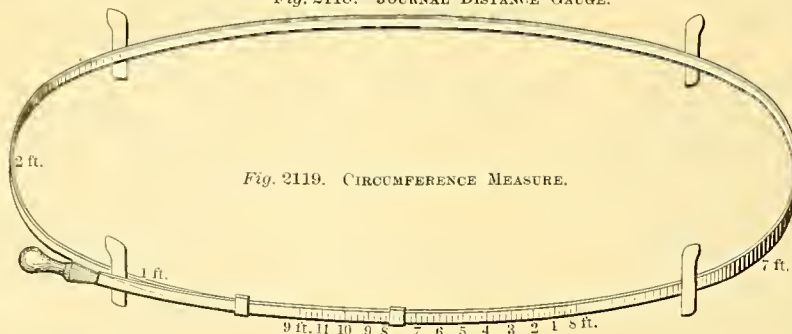


Fig. 2119. CIRCUMFERENCE MEASURE.

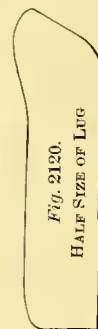


Fig. 2120.  
HALF SIZE OF LUG

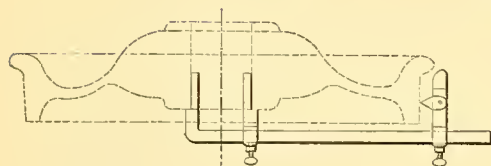


Fig. 2121.  
WHEEL-BORE TESTING GAUGE.

Another standard wheel gauge, between back of flanges, is shown in Fig. 1996.

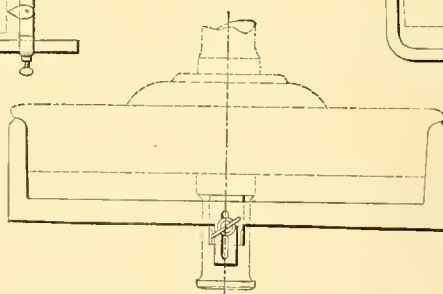


Fig. 2123. FLANGE AND JOURNAL GAUGE.  
MASTER CAR-BUILDERS' STANDARD WHEEL AND AXLE GAUGES.

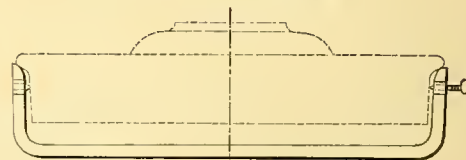


Fig. 2122.  
DIAMETER TESTING-GAUGE.

(These gauges were recommended for general use at the 16th Annual Convention of the Master Car-Builders' Association, Philadelphia, 1887.)



Fig. 2124.  
Section.

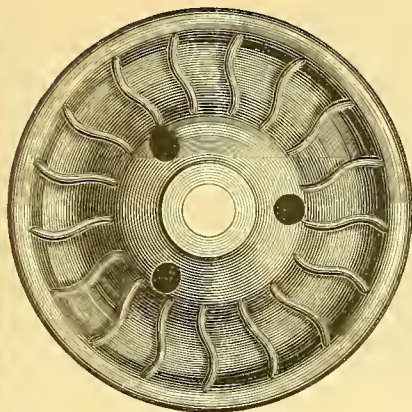


Fig. 2125.  
Back View.

WASHBURN WHEEL.

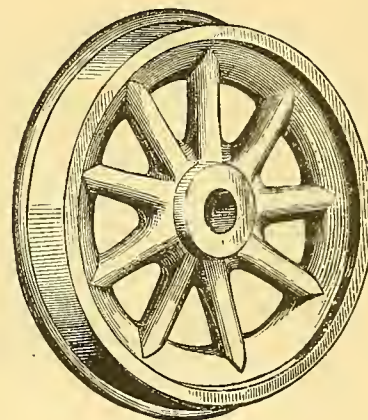


Fig. 2126.  
Front View.  
SPOKE WHEEL.



Fig. 2127.  
Section.

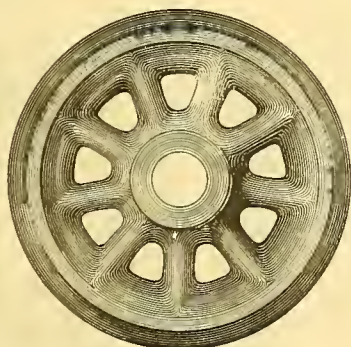


Fig. 2128.  
Front View.

HOLLOW-SPOKE WHEEL.

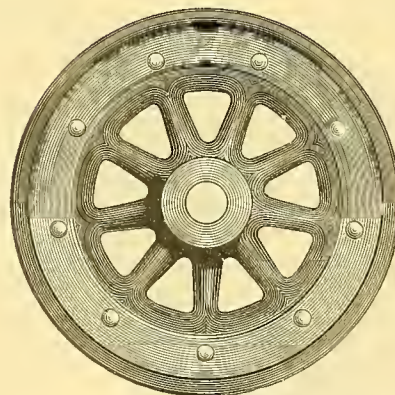


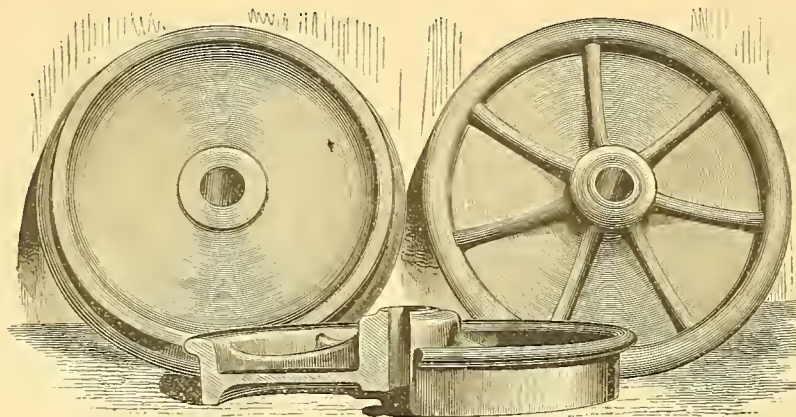
Fig. 2129.  
Front View.

COOPER ELASTIC WHEEL.



Fig. 2130.  
Section.





Back View.

Fig. 2131.  
SINGLE-PLATE WHEEL.

Front View.



Fig. 2132.  
Section.  
"COMBINATION"  
SINGLE-PLATE WHEEL.



Fig. 2133.  
Section.

SINGLE-PLATE WHEEL.

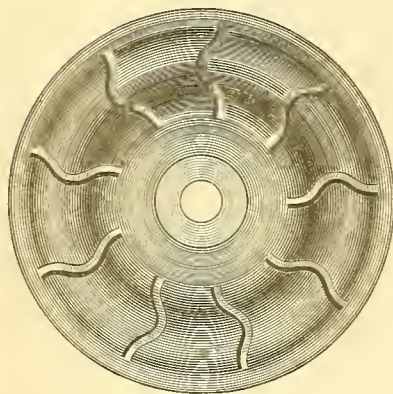


Fig. 2134.  
Back View.



Fig. 2135.  
Section.

DOUBLE-PLATE WHEEL.



Fig. 2136.  
Back View.

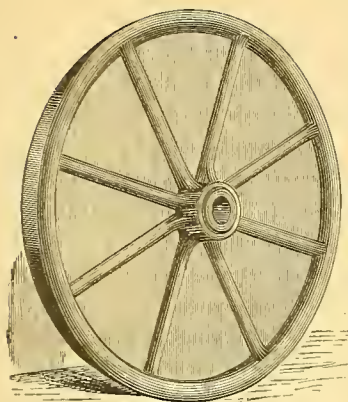


Fig. 2137.  
Back View.

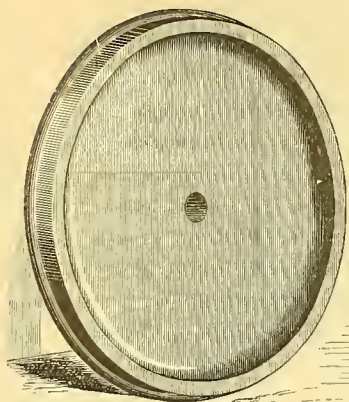


Fig. 2138.  
Front View.

SINGLE PLATE WHEEL, for Street Cars

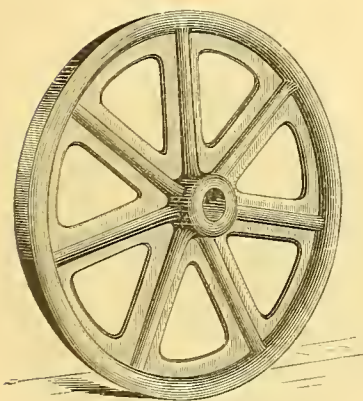


Fig. 2139.  
Back View.

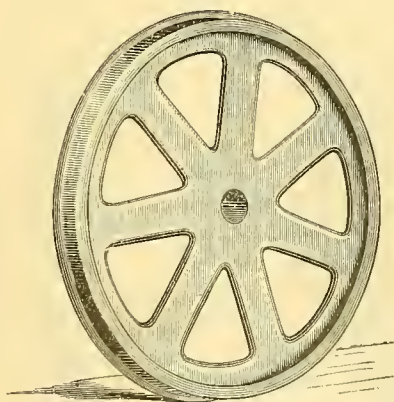


Fig. 2140.  
Front View.

OPEN-PLATE WHEEL, for Street Cars.

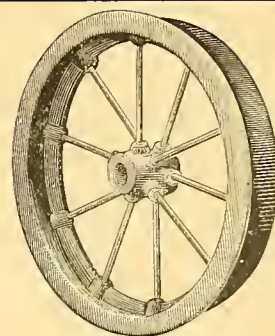


Fig. 2141.  
HAND-CAR WHEEL.  
(24 in. to 30 in. diameter.)

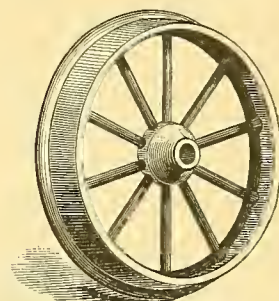


Fig. 2142.  
HAND CAR WHEEL.  
(Weight, 20 in. diameter, 70 lbs.)

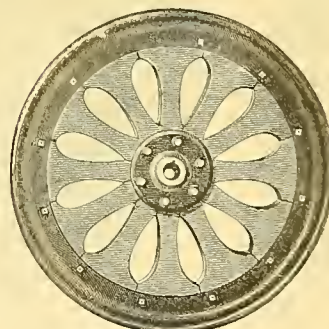


Fig. 2143.  
WOODEN HAND-CAR WHEEL.  
(18 to 24 in. diameter.)





*Fig. 2144.*

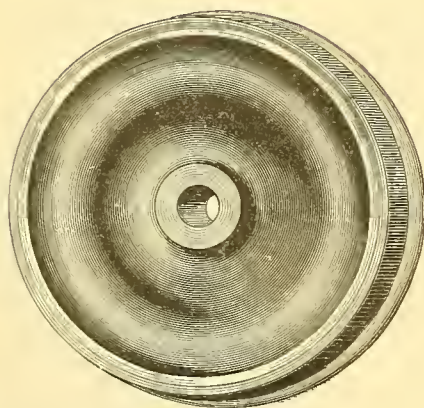


*Fig. 2145.*

THATCHER CORRUGATED (SINGLE-PLATE) WHEEL



*Fig. 2146.*  
Section.

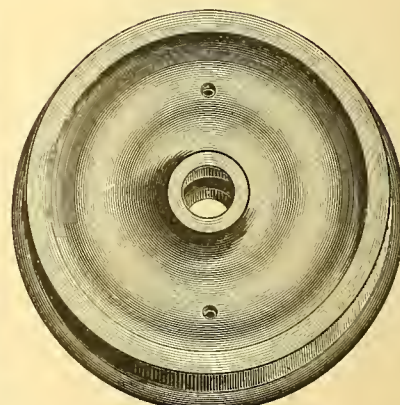


*Fig. 2147.*  
Front View.

SAX & KEAR WHEEL.



*Fig. 2148.*  
Section.



*Fig. 2149.*  
Front View.

SOLID STEEL WHEEL.



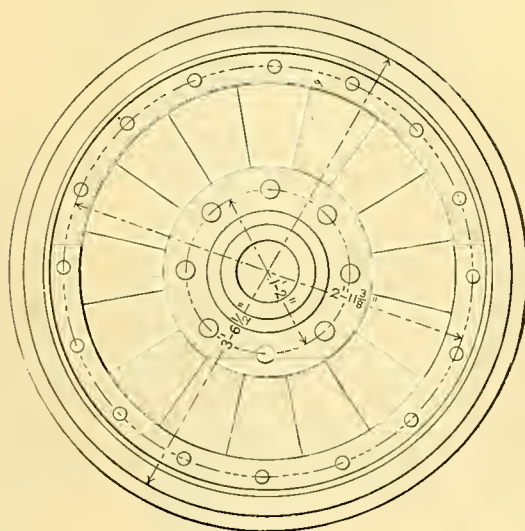
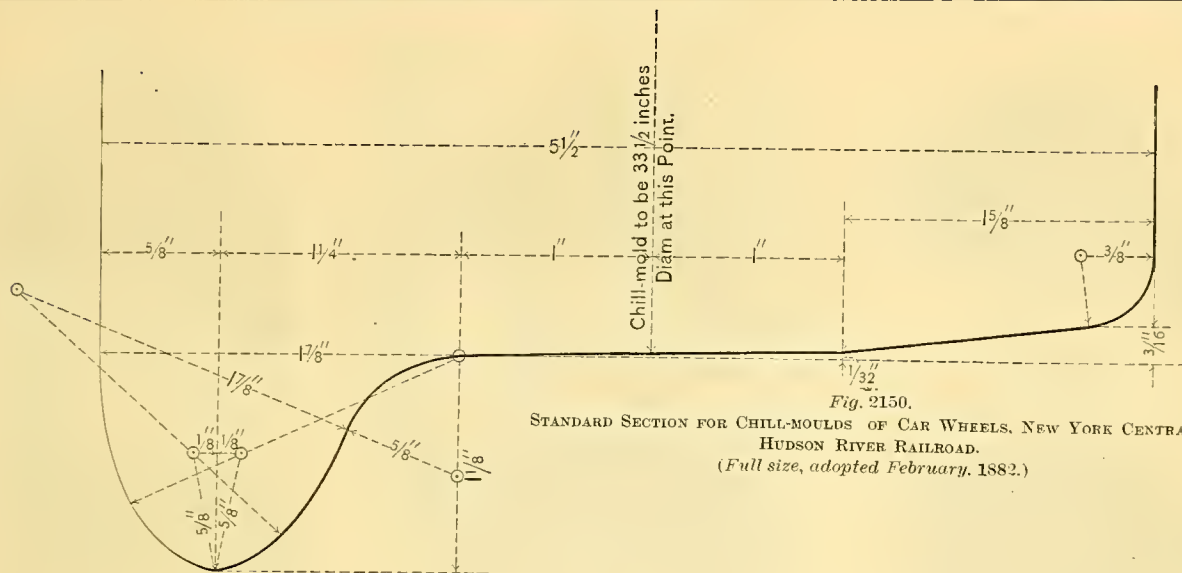


Fig. 2151. Side View,  
ENGLISH TEAK-WOOD CENTRE WHEEL.

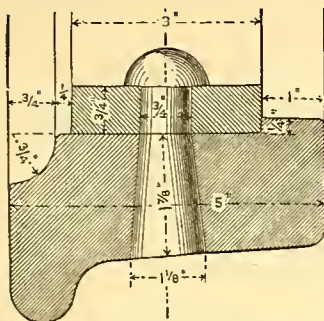


Fig. 2152.  
RIVET FASTENING.

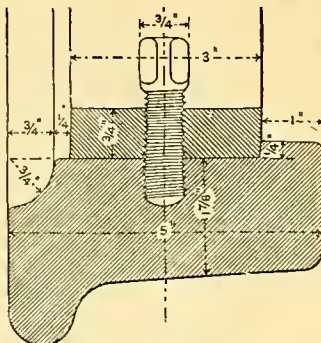


Fig. 2153.  
SET SCREW OR STUD FASTENING.

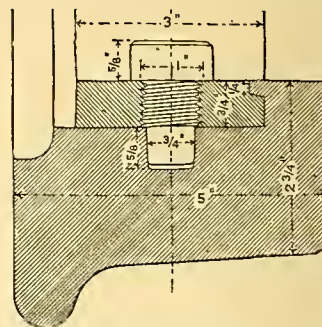


Fig. 2154.  
SET-SCREW FASTENING (PLAIN END).

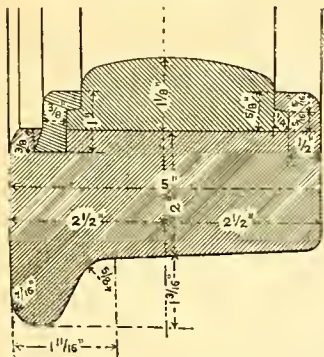


Fig. 2155.  
GIBSON FASTENING.

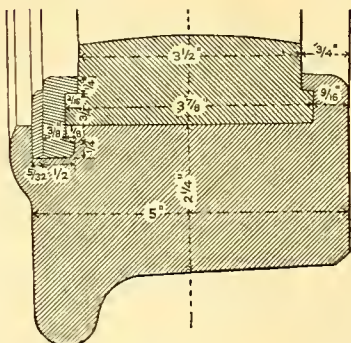


Fig. 2156.  
CARLTON & STROUDLEY FASTENING.

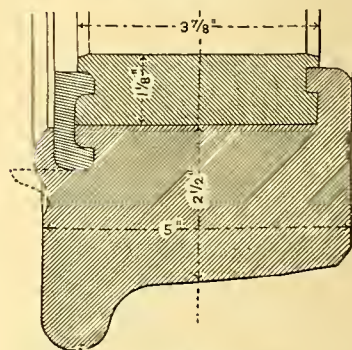
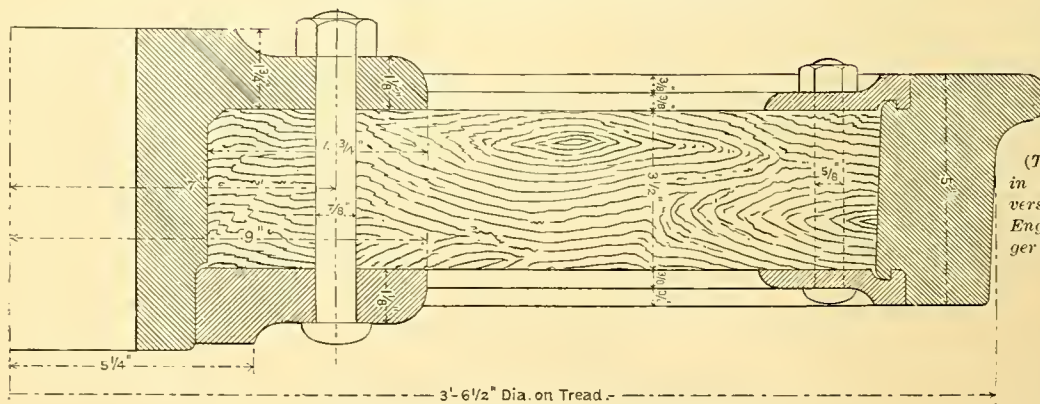


Fig. 2157.  
DRUMMOND FASTENING.

TIRE FASTENINGS FOR ENGLISH STEEL-TIRED WHEELS.



(This wheel is in almost universal use in English passenger service.)

Fig. 2158. Section. (Side View on preceding page.)  
ENGLISH MANSELL (TEAK-WOOD-CENTRE) WHEEL, with MANSELL RETAINING-RING.



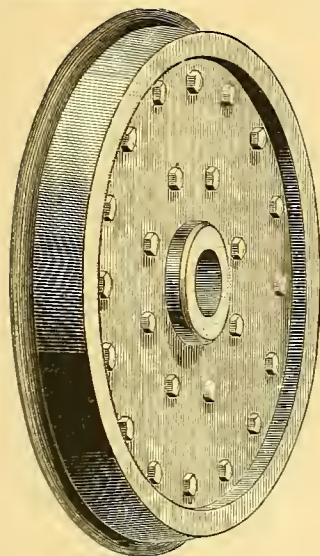


Fig. 2159.

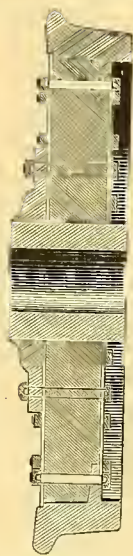


Fig. 2160.

ALLEN PAPER WHEEL.

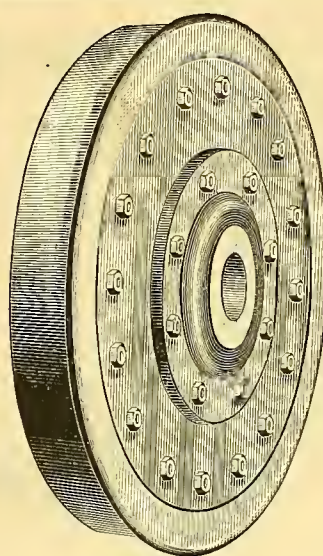


Fig. 2161.

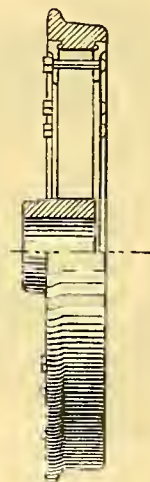


Fig. 2162.

Section and Side View of Fig. 2165.

Tire-bolt.  
Hub-bolt.Tire.  
Compressed Paper.Front Face-plate.  
Back Face-plate.

Wheel-centre, or Hub.

NAMES OF PARTS.

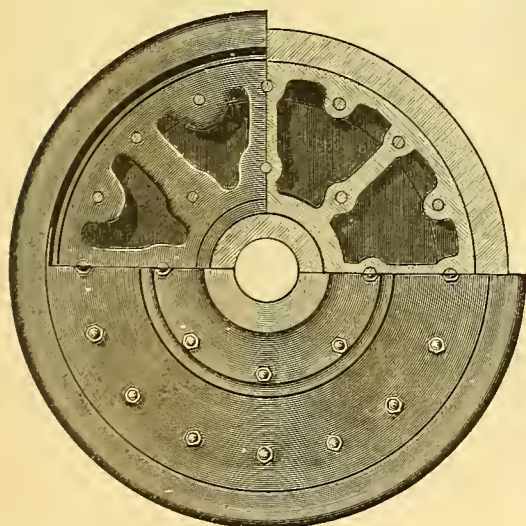


Fig. 2163.

SNOW INTERCHANGEABLE-HUB WHEEL.

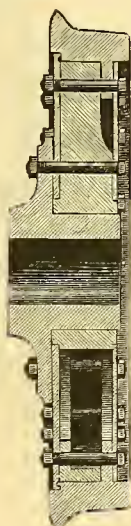


Fig. 2164.

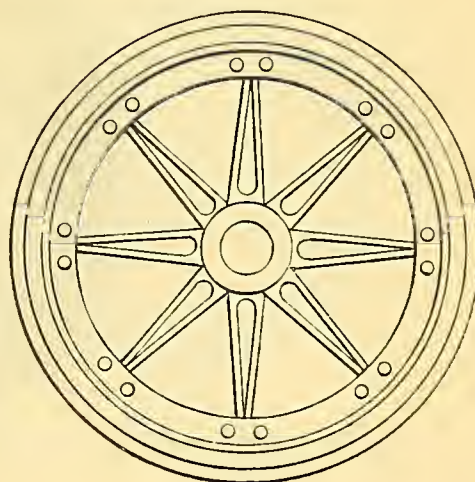
NAMES OF PARTS :  
Figs. 2163-64.Tire, with Annular Web.  
Mansell Retaining-ring.  
Skeleton, or Central Filling-piece  
Front Face-plates  
Back Face plates.  
Interchangeable Hub.

Fig. 2165.

KIRTLEY DOUBLE-SPOKE WHEEL, with MANSELL  
RETAINING-RING.



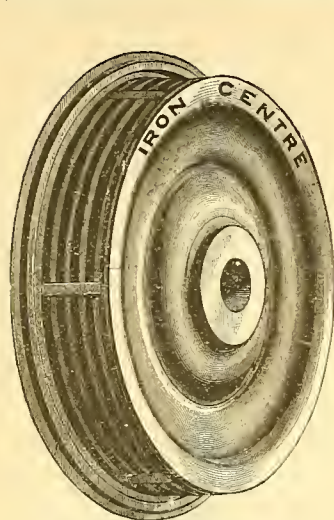


Fig. 2166.

Wheel-centre, showing CORRUGATIONS, LUGS and FLANGE, with lip entering groove in tire.



Fig. 2167.  
Section.

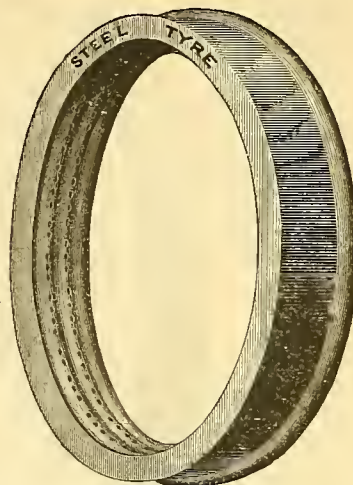


Fig. 2168.

Tire, Showing CORRUGATIONS and PITS.

NAMES OF PARTS ; Fig. 2167.

- A. Steel Tire.
- B. Wheel-centre (cast-iron).
- C. Packing.
- E. Retaining-lip.
- G. Wheel-centre Flange.
- H. Cover-plate.

ATWOOD HEMP-PACKED WHEEL

NAMES OF PARTS : Figs. 2169-71.

Skeleton, or Hub.

Back Face-plate.

Front Face-plate.

Tire, with Inner Ring.

Tire-bolts.

Hub-bolts.

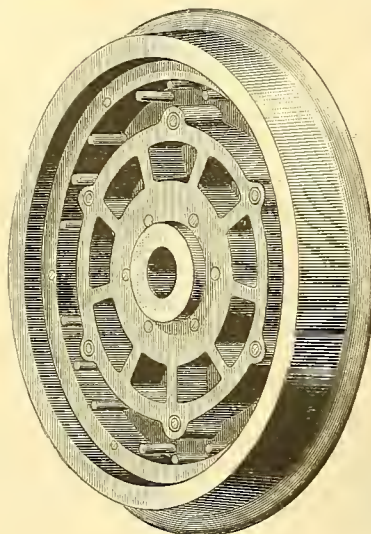


Fig. 2169.



Fig. 2170.  
PAIGE WHEEL.

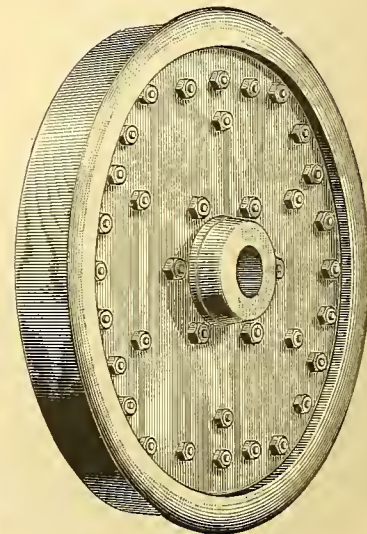


Fig. 2171.

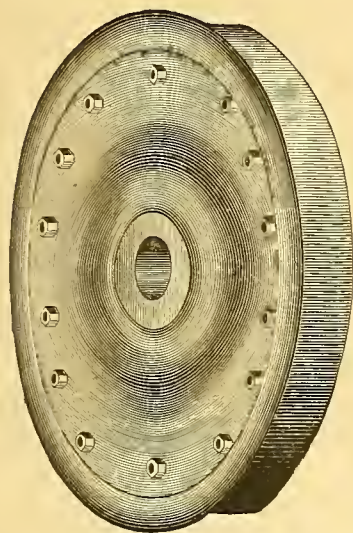


Fig. 2174.



Fig. 2175.

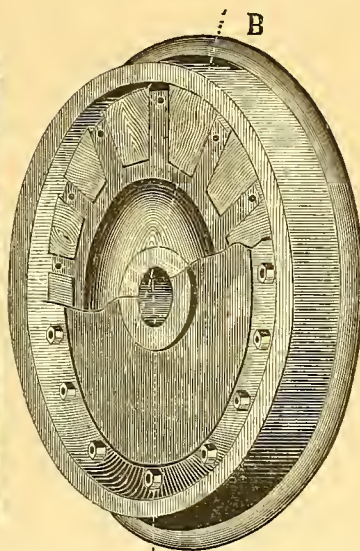


Fig. 2176.

NAMES OF PARTS; Figs. 2174-76.

*Tire, with Internal Flange.*

*Skeleton, or Wheel-centre.*

*Packing Blocks.*

*Packing-block Pockets.*

*Radial Arms.*

THOMAS STEEL-TIRED WHEEL.



Fig. 2177.  
Section.

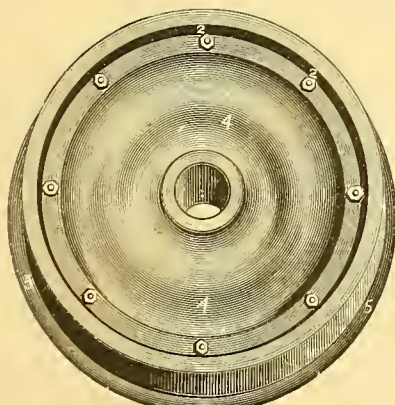


Fig. 2178.  
Front View.



Fig. 2179.  
Section.

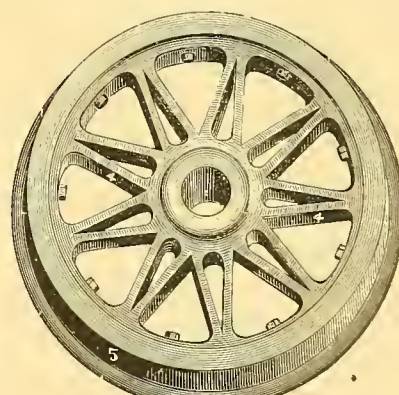


Fig. 2180.  
Front View.

STEEL WHEEL, with TIRE and MANSSELL RETAINING-RINGS.  
1. Retaining-ring. 2. Tire-bolt. 4. Wheel-centre. 5. Tire.

WROUGHT-IRON WHEEL, with TIRE. (Old Style.)  
2. Tire-bolt. 4. Wheel-centre. 5. Tire.

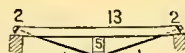


Fig. 2181.

KING-POST TRUSS.

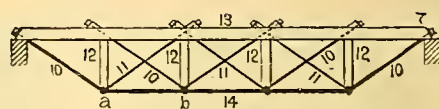


Fig. 2185.

PRATT OR WHIPPLE TRUSS.

(See also "Bastard Pratt" in Dictionary.)

## TRUSSES.

NAMES OF PARTS OF TRUSSES;  
Figs. 2181-2188.

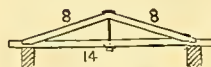


Fig. 2182.

KING-POST TRUSS.

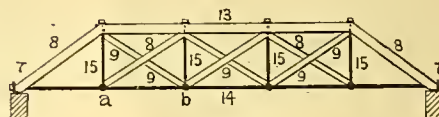


Fig. 2186.

HOWE TRUSS.

(See also "Bastard Howe" in Dictionary.)

1. Truss-rod.
2. Truss-rod Washer.
3. Truss-rod Bearing.
- 3'. Truss-rod Saddle.
4. Truss-block.
5. King-post.
6. Queen-post.
7. Skewback.
8. Brace.
9. Counterbrace.
10. Brace-rod.
11. Counterbrace Rod.
12. Post.
13. Top Chord.
14. Lower Chord.
15. Vertical Rod.

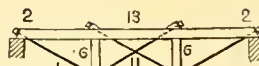


Fig. 2183.

QUEEN-POST TRUSS.

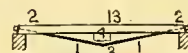


Fig. 2187.

TRUSSED-BEAM.

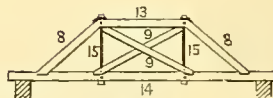


Fig. 2184.

QUEEN-POST TRUSS.

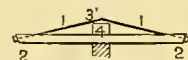


Fig. 2188.

TRUSSED-BEAM.

(In addition to the above there is a form of truss in which both tension and compression members are inclined at an equal angle, which is known to bridge engineers as the WARREN or TRIANGULAR truss, and has been applied to car-building in the New York, West Shore & Buffalo standard freight car. Figs. 97-101.)







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*[See the Index to Advertisements following the Preface.]*





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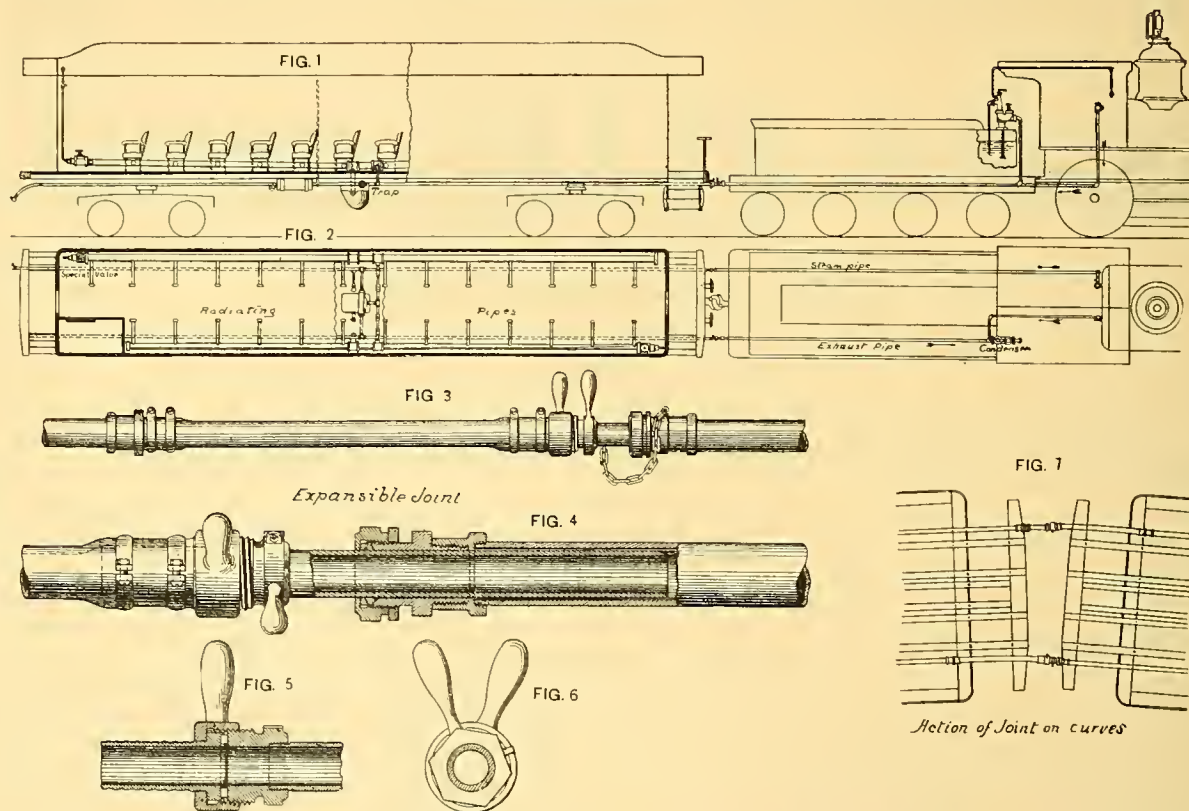
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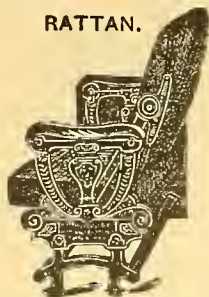
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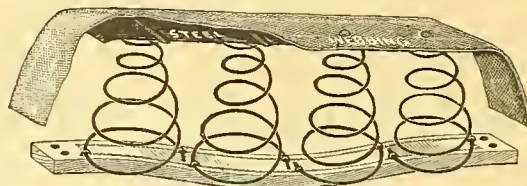
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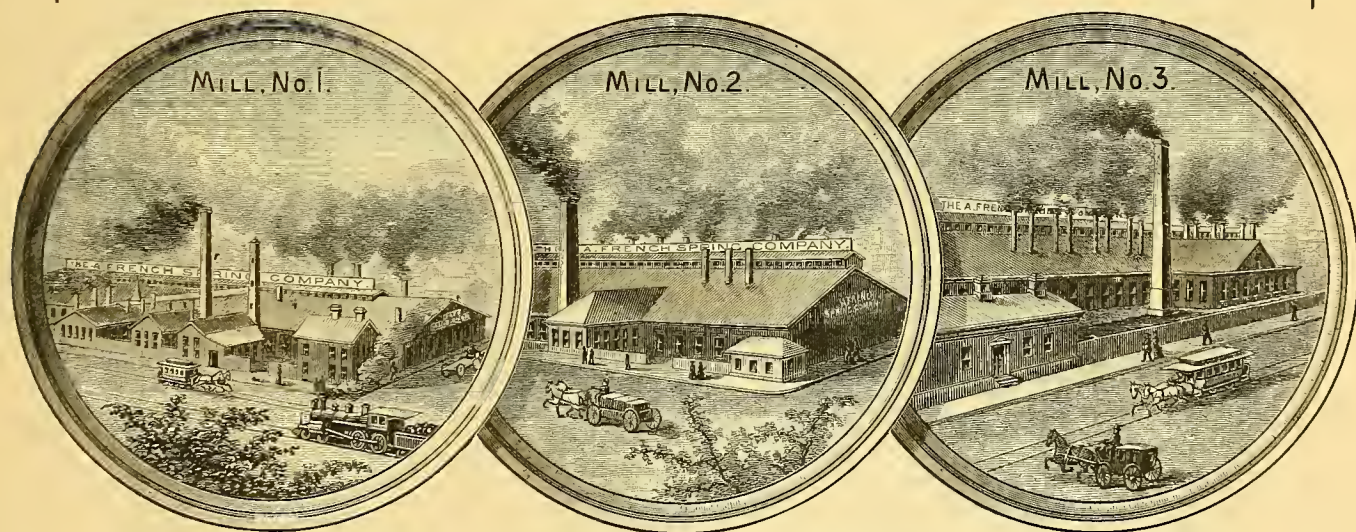
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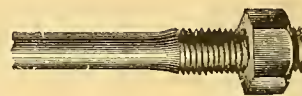
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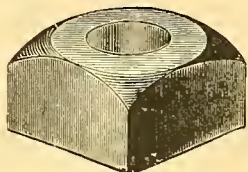
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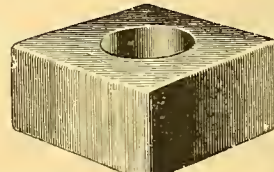
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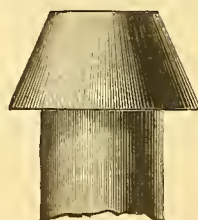
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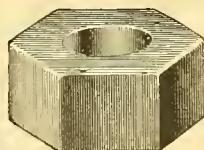
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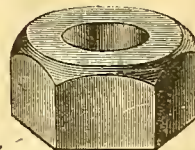
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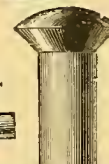
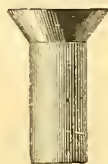
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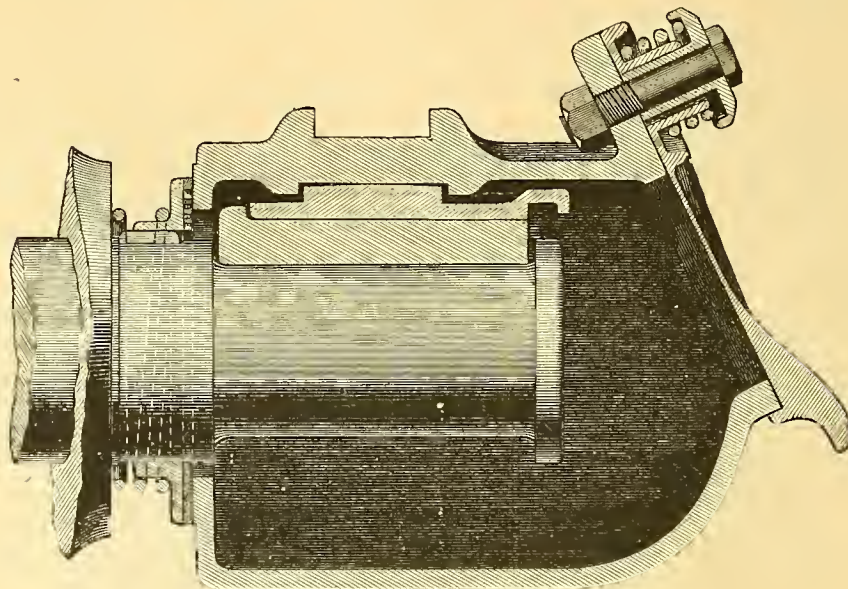


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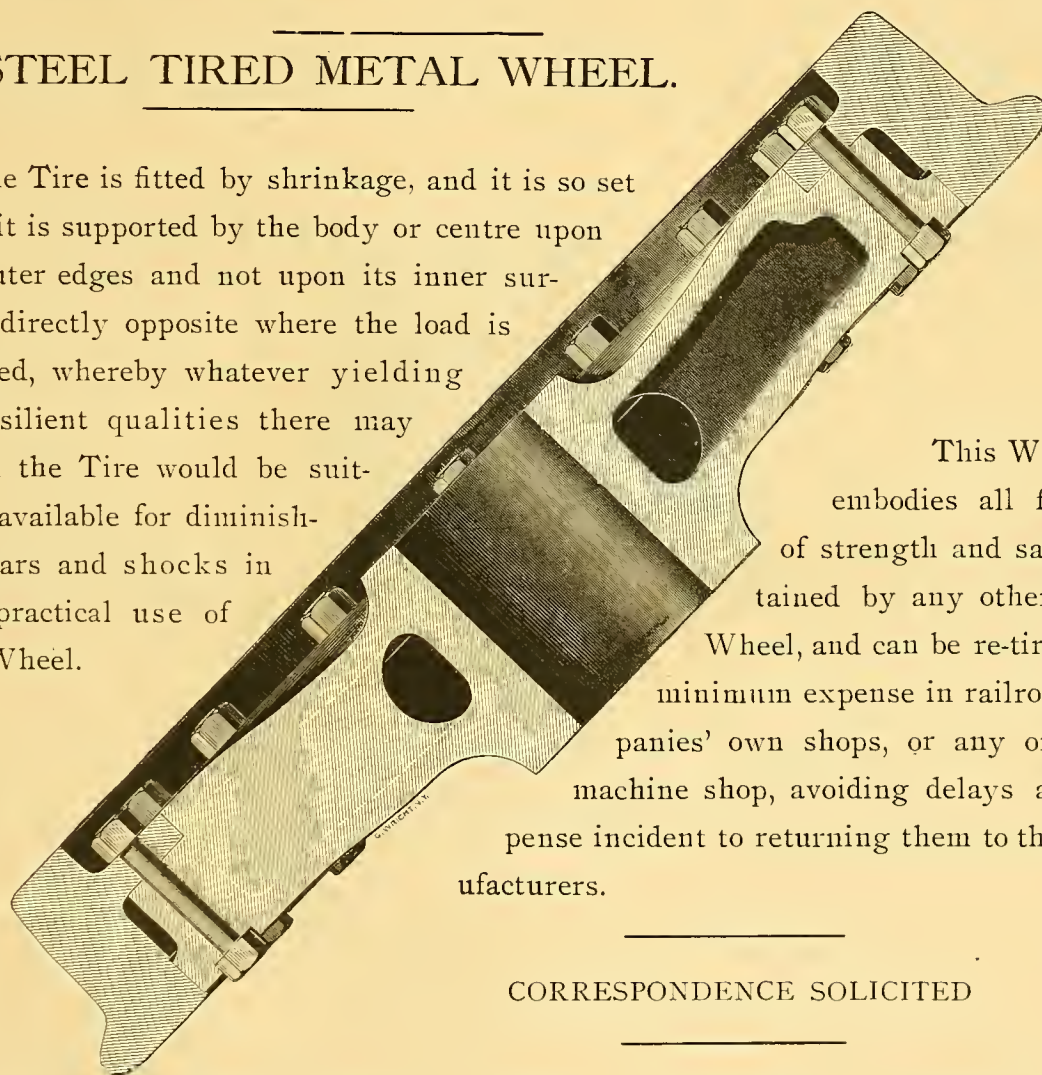


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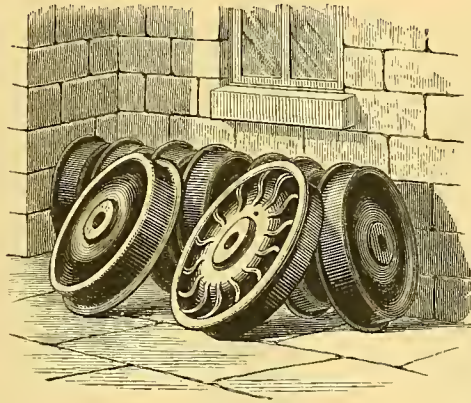
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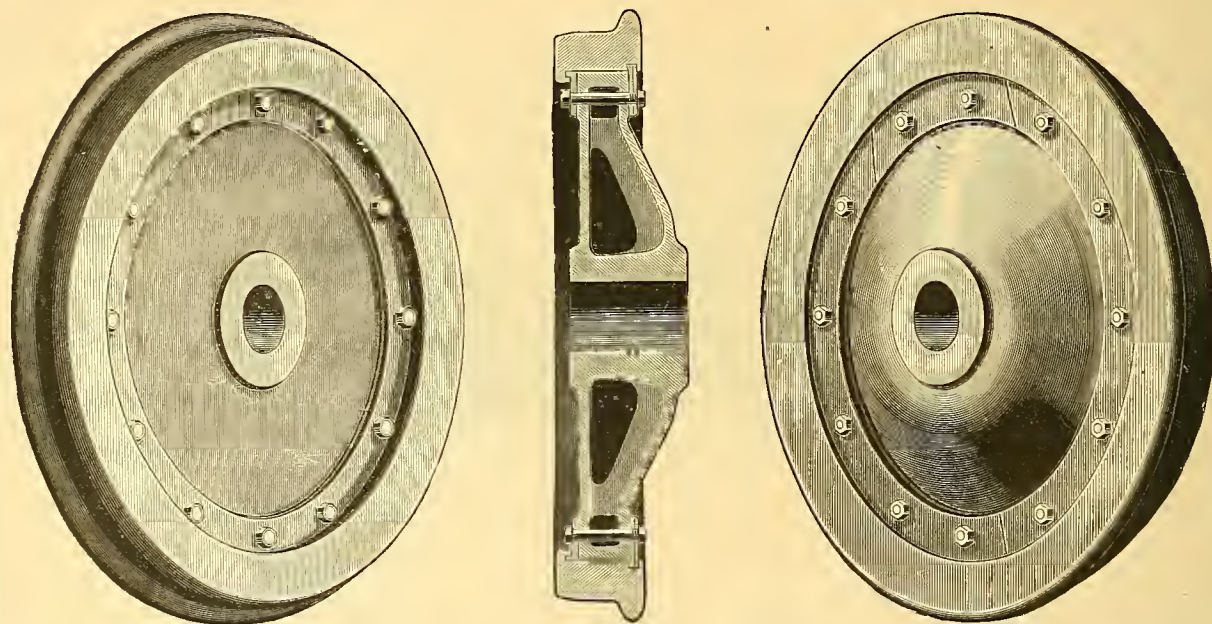
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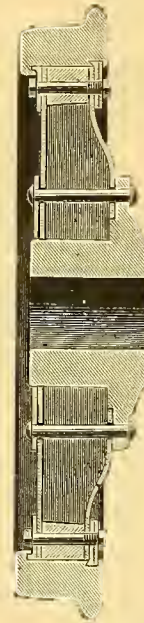
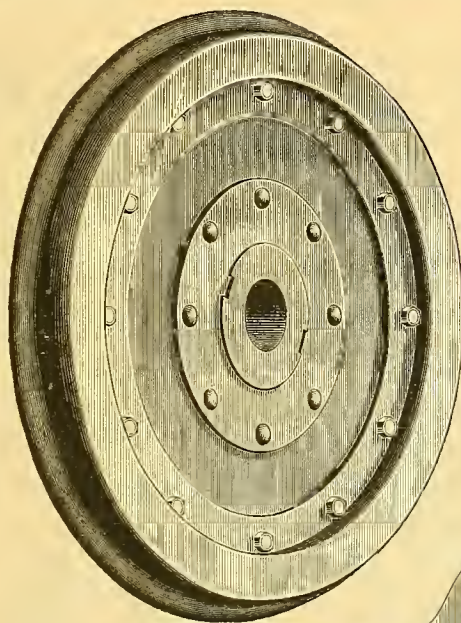


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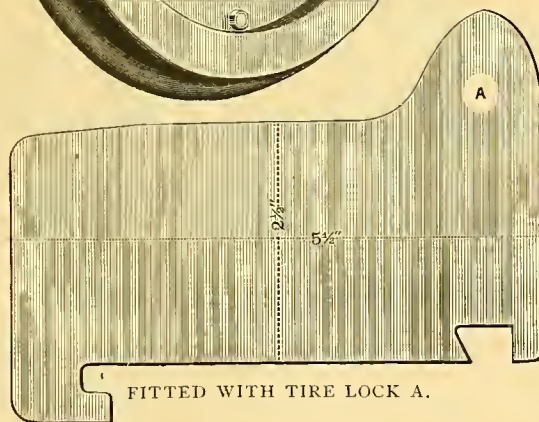


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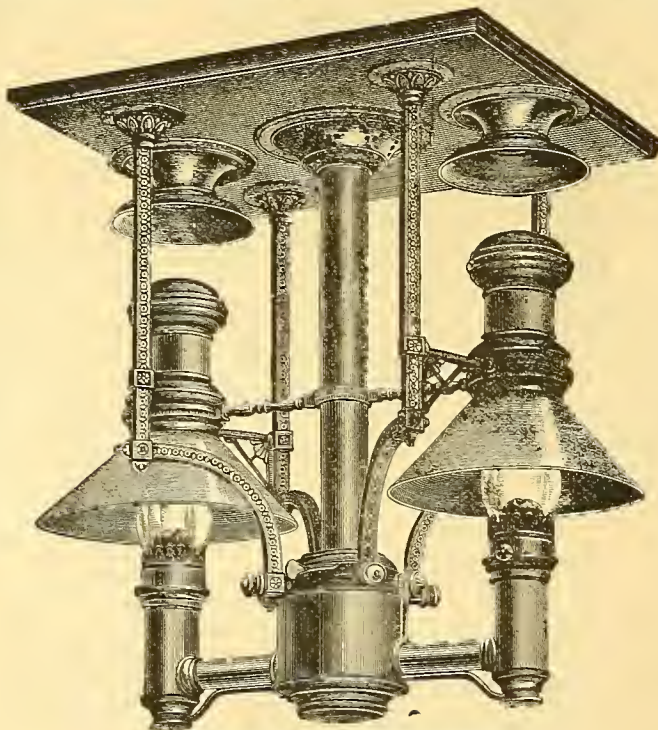
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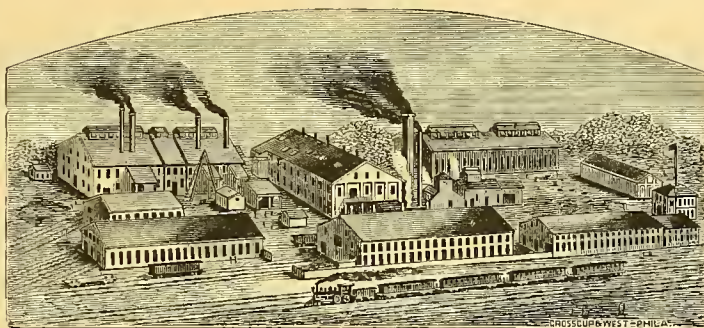
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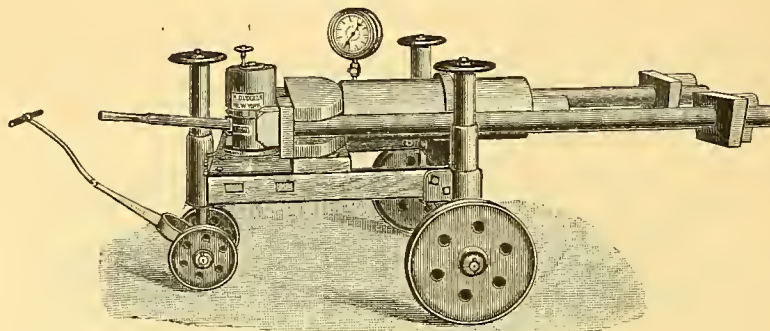
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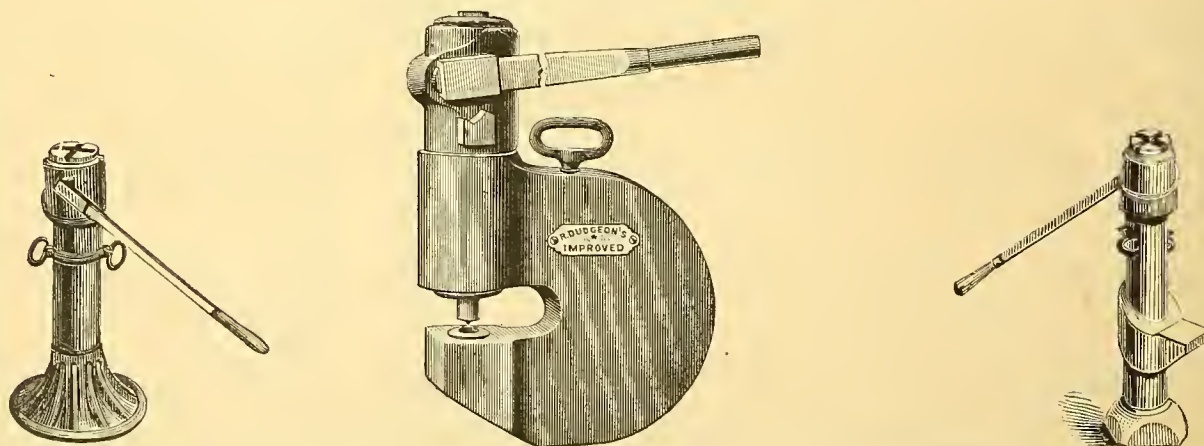
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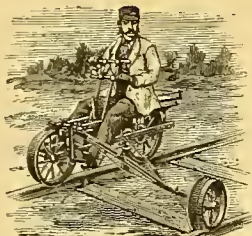


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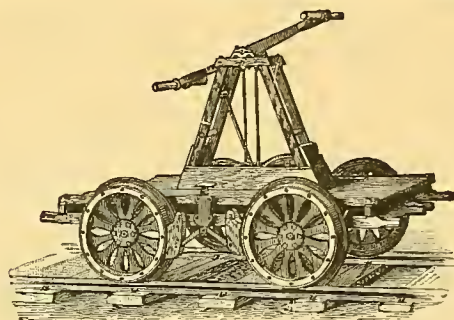


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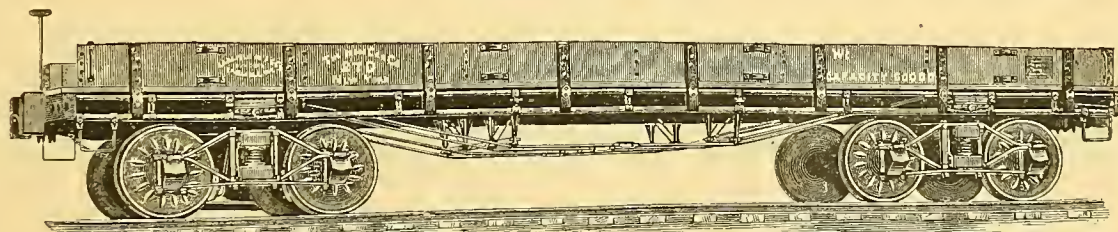
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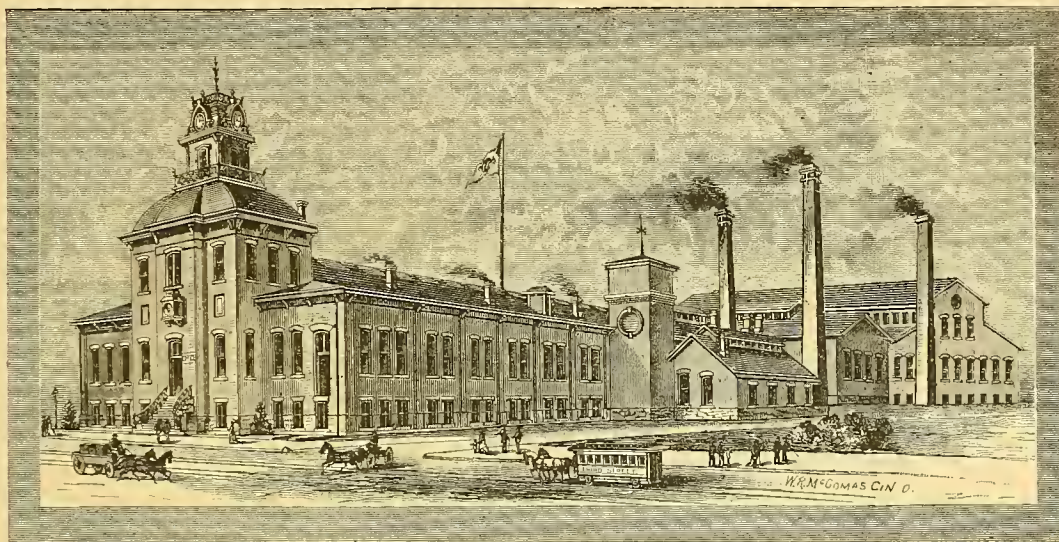
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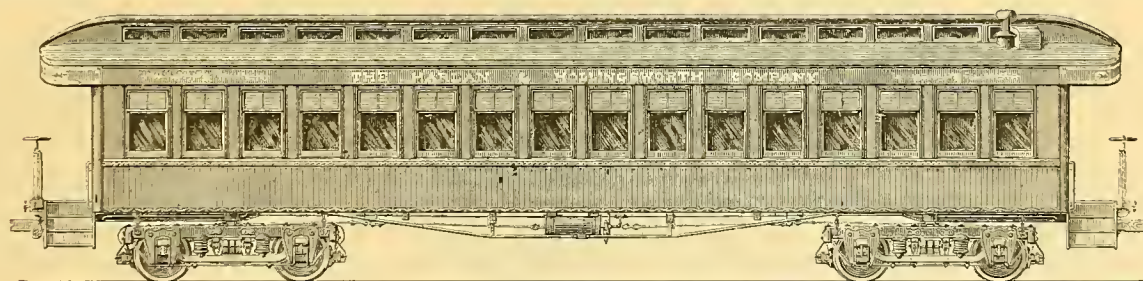
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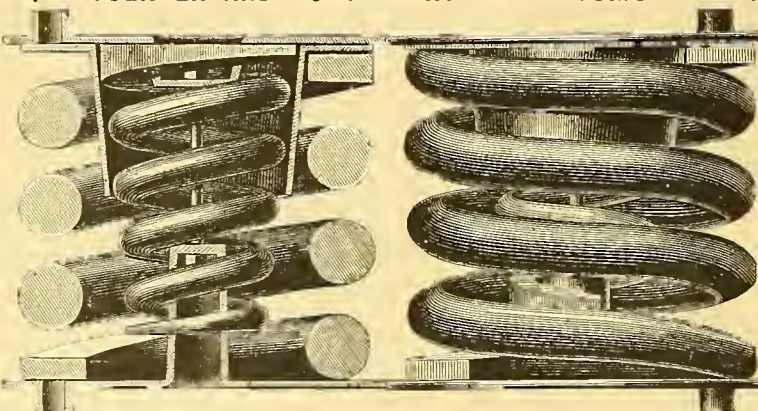
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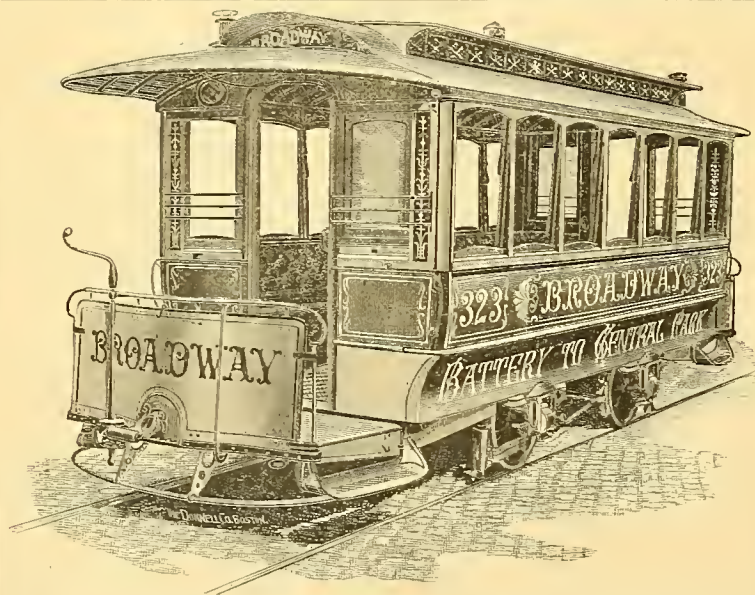
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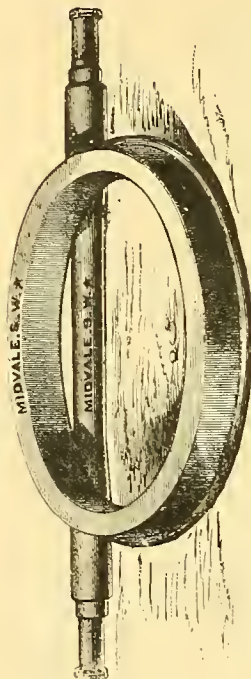
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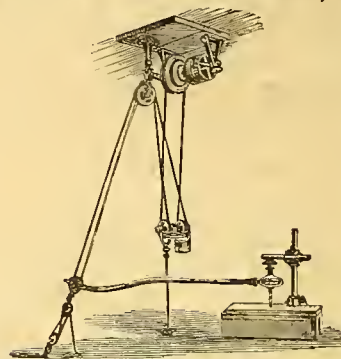
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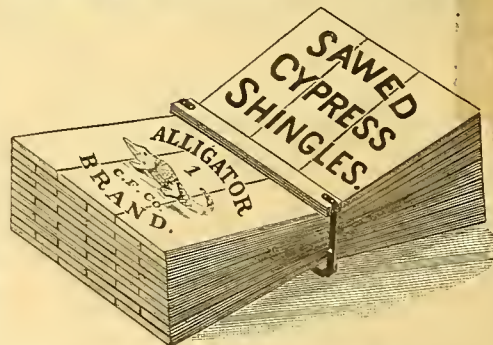
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